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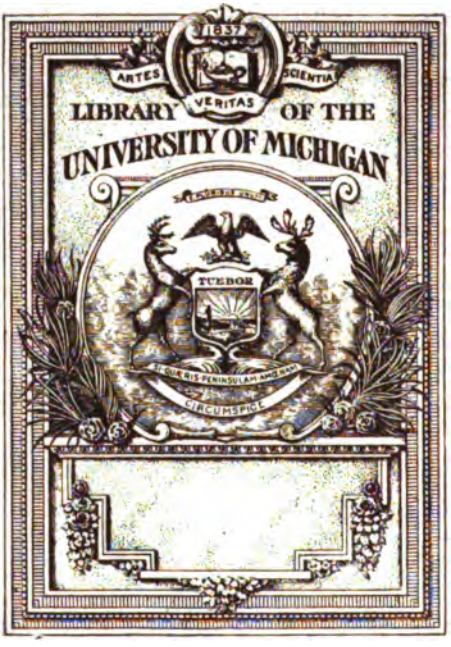

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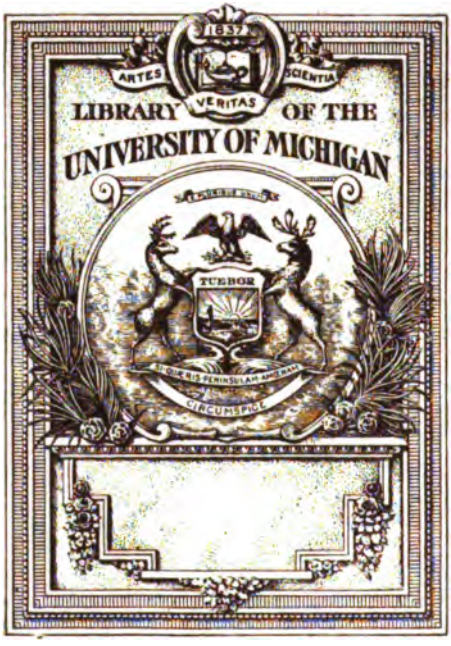

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MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Volume 3

Los Gatos, California.
1907

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Volume 3 January, 1907 Number 1

MUHLENBERGIA

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Los Gatos, California.

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Volume 3 No. 1

MUHLENBERGIA

A. A. HELLER, Editor

Los Gatos, California, January 30, 1907

SOME PLANTS ERRONEOUSLY OR QUESTIONABLY ATTRIBUTED TO SOUTHERN CALIFORNIA

By S. B. Parish

In a previous paper in Zoe, February-April, 1901, the writer indicated certain *plantae inquirendae*, whose presence, or place, in the flora of southern California was based on either ascertained error, or unsatisfactory evidence. One of the plants there mentioned, *Sambucus Mexicana*, has since turned up, Mr. Hall having collected it in the San Jacinto mountains; if, at least, we concede *S. velutina* to be identical with that species. But Mr. Hall's specimens suggest that *S. velutina* would be disposed of better as a variety of the common *S. glauca*.

The object of the present paper is to call attention to some other erroneous or questionable references. But first it is to be noted that the simple fact that a plant, purporting to have been collected by an early explorer, has not been rediscovered since, is by no means sufficient evidence of an erroneous record. It is true that our present acquaintance with the flora is far more intimate than that of the traveler, who passing hastily through

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the country, or tarrying for but a limited period, collected what came in his way. Yet the failure to rediscover such a plant may be due to its extreme rarity, and the happy chance of any day may bring it again to light; or it may be an actual disappearance. Most of us can call to mind more than one instance of such apparent extinctions, either at last re-established, or yet unaccounted for. Such experience should stimulate those who have the opportunity for search to endeavor the rediscovery of these elusive or doubtful plants.

But an early record is to be regarded with suspicion when it sporadically locates in one region a plant which later investigations indicate as belonging regularly to a different horizon. Especially does this doubt attach when the plant is said to be common;" for one may occasionally pick up a straggler quite out of its proper habitat. And, indeed, it would be strange did not errors sometimes occur, when one considers the ease with which locality labels, or numbers, might be misplaced in collections made during long journeys, perhaps of thousands of miles.

These early recorded plants that have failed of subsequent discovery must remain a doubtful element in our flora. A much more thorough acquaintance with our plant life must be acquired before they may be definitely dropped.

ANDROPOGON SCOPARIUS Michx. Fl. **1**: 87.

This grass was reported from "southern California" by Scribner in Am. Grasses, **1**: 19, on a specimen in the National Herbarium labeled "427 S. M. Tracy, 1887. Sabinda, Cal." According to Mr. Tracy it should read "472. Salida, Col."

PANICUM CAPILLARIOIDES Vasey, Cont. U. S. Nat. Herb. **1**: 54.

Reported by Scribner, Am. Grasses, **2**: 52, as extending from "southern California to Texas," but all the material in the National Herbarium is from the latter State, nor can I learn of any collections in our limits.

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STIPA PRINGLEI Scribn. Cont. U. S. Nat. Herb. **3**: 54.

"Dry slopes, Texas to Arizona and southern California," according to Scribner, Am. Grasses, **2**: 133. This also is unrepresented in the National Herbarium by Californian specimens.

TRIODIA PULCHELLA H. B. K. Nov. Gen. **1**: 155.

This strictly desert species is reported by Dr. Beal, Grasses N. A. **2**: 468, as collected by Palmer at "Los Angeles, Cal," an obvious error for Los Angeles bay in Lower California. It occurs, however, in the eastern part of the Colorado desert.

FESTUCA DASYCLADA Hack.; Beal, Grasses N. A. **2**: 602.

This also has been reported from "southern California," by Scribner, Am. Grasses, **2**: 280, but the only specimen in the National Herbarium is Parry's type from Utah. It may, however, reach our eastern borders.

ALLIUM PARRYI Wats. Proc. Am. Acad. **14**: 231.

Parry's type was collected at Bear Valley in the San Bernardino monntains, and not in the "Coast Ranges," as stated in the original description. It is abundant in that Sierran valley, and occurs sparingly elsewhere in the same neighborhood. Several of our alliums appear to be very local.

LILIUM WASHINGTONIANUM Kellogg, Proc. Cal. Acad. **2**: 13.

Palmer is reported to have collected this lily in the Cuyamaca mountains by Watson in Proc. Am. Acad. **14**: 255, and Bot. Cal. **2**: 165. These mountains have been well explored by several botanists, but no subsequent collections have been made; nor does the ascertained range of the plant indicate its presence so far south. There can be little doubt of the erroneousness of this reference.

QUERCUS MOREHUS Kellogg, Proc. Cal. Acad. **2**: 36.

This oak is reported as collected on Santa Catalina Island by Dill, Gard. & Forest, **5**: 72. It is regarded by Greene, W.

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Am. Oaks, 79, and Sargent, Sylva, 8: 119, as a hybrid between *Q Wislizeni* and *Q. Kelloggii*. As neither of the supposed parents are known from the island, or are likely to be found there, either the hybridity of this oak, or its presence on the island, must be an error.

THELYPODIUM LACINIATUM Endl. Gen. Pl. 876.

This has been reported from Santa Catalina Island, but without doubt by inadvertence for *T. lasiophyllum* Greene, a species known to occur on the island, and widely distributed on the adjacent mainland. There is no specimen of *T. laciniatum* from the island in the Brandegee herbarium.

LUPINUS ARIZONICUS Wats. Proc. Am. Acad, 12: 250.

Parry and Lemmon's collection of this plant, given as "near San Bernardino," in Bot. Cal. 2: 440, was made at or near Whitewater, in the Colorado desert. The species is strictly a desert one.

OXALIS CORNICULATA L. Sp. Pl. 435.

This has been reported several times from our region: Bot. Cal. 1: 96, "most common south of Santa Barbara;" Davidson, Pl. Los Ang. Co., "foothills from Santa Monica to Pasadena;" McClatchie, Fl. Pasad. 635, "frequent along streets." Yet it is doubtful if it occurs otherwise than as an escape, as in McClatchie's note. As such the variety *atropurpurea* Planche, has established itself in places in the streets of San Bernardino, notably affecting the crevices of pavements. The other references are to a plant common on the mesas near the coast and for some fifteen miles or more inland in the canyons of the coast mountains. All that I have examined are referable to *O. Wrightii* Gray, but quite possibly *O. pumila* Nutt. may be detected in the coast mountains.

CONDALIA PARRYI Weberbauer, in Eng. & Prantl, Nat. Pfl. 3: Abt. 5. 404.

Zizyphus Parryi Torr. Bot. Mex. Bound. 46.

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Parry's second station noted in Bot. Cal. 1: 100, as "east of San Bernardino," should be Whitewater canyon, which makes into the San Bernardino mountains from the Colorado desert. It is exclusively a desert species.

MAMILLARIA ARIZONICA Engelm. in Brew. & Wats. Bot. Cal. 1: 244.

In characterizing this species Dr. Engelmann expressed the opinion that it probably would be found to extend into southeastern California. Its authenticated range indicates this as highly probable, but as yet it has not been discovered within the State limits. Dr. Coulter in Cont. U. S. Nat. Herb. 3: 121, cites a specimen from California collected by Parish in 1880. This is in the Engelmann herbarium, and consists of three separate areolae with their spines, and has a label, in Dr. Engelmann's handwriting: "Mamillaria Arizonica? deserti?" It certainly came from the same plants on which Dr. Engelmann subsequently founded his *M. deserti*. Dr. Coulter very properly reduced both species to varieties of *M. radiosa* Engelm.

OPUNTIA MOJAVENSIS Engelm. & Bigel.; Engelm. Proc. Am. Acad. 3: 293.

This is founded, in two lines of description, on a specimen collected by Bigelow in 1853, "on the Mojave, west of the Colorado." In Pac. R. R. Rep. 4: 40, this specimen is said to consist of "a few fragments, with a sterile fruit," and plate 9, *f.* 6-8, shows a "sterile and degenerate" fruit and two bunches of spines, neither fruit nor spines exhibiting any distinguishing characters. The specimen, such as it is, is still preserved in the Engelmann herbarium, at the Missouri Botanical Garden, according to Coulter, Cont. U. S. Nat. Herb. 3: 427. Dr. Engelmann himself, at a later period, appears to have regarded the species as of doubtful validity, for in Bot. Cal. 1: 248, he says he "merely indicated it, for the attention of future explorers." In any case it could be identified only conjecturally, since the type had neither flower nor perfect fruit, and, in fact, consists of little

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more than a few spine-clusters. Fifty years have elapsed without any further traces being discovered of this supposed species, yet it still holds a place in our books. It would seem that the time has come for dropping it.

LOMATIUM VASEYI C. & R. Cont. U. S. Nat. Herb. 7: 216.

George R. Vasey's type specimen is quoted from the "San Bernardino mountains," in Bot. Gaz. 13: 145. It really came from the mesas near San Bernardino. The species is a mesa plant, rarely reaching the lower foothills, and never the mountains.

FRASERA PARRYI Torr. Bot. Mex. Bound. 156.

The type is said to have been collected "in the mountains east of San Diego, on the eastern slope." This appears to bring it into the desert region, and to that extent is probably an error, as the plant belongs to the cismontane flora.

MIMULUS INCONSPICUUS Gray, Pac. R. R. 4: 120.

The type specimen, in the Gray herbarium, is labeled: "Damp hillsides, Los Angeles, Bigelow, 1854." It consists of a few poor scraps, and Dr. Jepson, who obligingly examined it at my request, thought it apparently identical with Dr. Gray's more recently described var. *latidens* from the vicinity of San Diego. Resident botanists have not yet succeeded in discovering either species or variety at Los Angeles, nor does the species appear to have been collected in recent times in southern California.

MALACOTHRIX INCANA T. & G. Fl. N. A. 2: 486.

Nuttall is reported to have collected the type of this species on "an island in the bay of San Diego." The place intended is probably the Coronados Islands, beyond the Bay of San Diego, and belonging to the Mexican State of Lower California. The plant has been rediscovered in recent times (1886) on the island of San Miguel.

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CHRYSOPSIS VILLOSA SESSILIFLORA Gray, Syn. Fl. 1: Part 2. 123.

This plant is said by Dr. Gray to grow "near the coast, from Mendocino Co. to San Diego and Arizona." Dr. Jepson reports it as rare within the limits of his Flora, but "common southward." I have never been able to see an authentic specimen from southern California, and it is certainly not common. Plants listed under this name by Davidson, Pl. Los Ang. Co. 13, and by McClatchie, Flora Pasad. 644, are monocephalous forms of *C. fastigiata* Greene, a species very different in pubescence, leaf and head from true *C. sessiliflora*.

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A NEW CLOVER

By P. B. Kennedy and Laura F. McDermott

Trifolium orbiculatum

Plant 1 to 2 dm. high, perennial, not involucrate, stems covered with short white pubescence, leaflets pubescent along the midrib or on one-half of the under side: root stout and long: stems erect: stipules at base longer and more linear than those above, all acute, adnate one-half to two-thirds their entire length, .5 to 1 cm. broad and 1 to 1.5 cm. long, lobes irregularly tridentate near apex, lanceolate and very slightly villous: leaflets .6 to 1.6 cm. broad, and .8 to 2.5 cm. long, lower leaflets smaller, generally broadest at the base, tapering to a cuspid apex; upper leaflets broadly oblong, rounding at the apex, some nearly orbicular to deltoid; petioles of lower leaves 6 to 8 cm. long; upper petioles 3 to 4 cm. long: peduncles axillary, assurgent, 4 to 10 cm. long: heads terminal or binate, completely reflexed in age by the deflexion of the pedicels: lemon yellow flowers on long pedicels 12 to 15 mm. long: calyx dull green, 7 to 9 mm. long, 10-nerved, alternating nerves inconspicuous, outer surface covered with short white pubescence, teeth 4 to 5 mm. long, slightly longer than the tube, very inconspicuously cross veined, with an occasional bifid tooth: vexillum 6 mm. broad, 17 mm. long, apex rounding, sometimes slightly emarginate, base abruptly tapering; blade of wings nearly 1 cm. long, reflexed, tip rounding, base auricled; blade of keel 3 mm. broad, 5 mm. long, broader than the wing, beak obtuse: ovary villous-pubescent, 2-ovuled; pod 1-seeded; seed obcordate.

The type, which is deposited in the Nevada Agricultural Experiment Station herbarium, was collected at Thompson Falls, Montana, June 7, 1902, by J. W. Blankinship, no. 6.

Its nearest ally is *T. latifolium* (Hook.) Greene, from which it differs in the shape and texture of the leaves, the leaves being decidedly thick as compared with *T. latifolium*. The long reflexed pedicels of the flowers and the much larger wing as compared with *T. latifolium* give it distinct specific characters.

Nevada State University, Reno, Nevada.

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SOME NEW NAMES

By T. D. A. Cockerell

The following corrections of nomenclature are offered in view of the forthcoming new edition of the Catalog of North American plants:

Isoetes echinospora brittoni

Isoetes braunii Durieu, Bull. Soc. Bot. France, **2**: 101. 1864. Not *Isoetes braunii* Unger, Gen. et Sp. Plantarum Fossilium, 597. 1850.

Salix cascadensis

Salix tenera Anders. DC. Prodr. **16**: Part 2. 288. 1864. Not *Salix tenera* A. Braun, in Unger, Gen. et Sp. Plantarum Fossilium, 418. 1850.

When working on *Hymenoxys*, I had occasion to examine *Syntrichopappus lemmoni* Gray and concluded that it ought to be separated from *Syntrichopappus* as a distinct genus, thus:

Microbahia gen. nov.

Close to *Syntrichopappus*, but pappus entirely absent: rays rose-purple without yellow: leaves entire.

Microbahia lemmoni (Gray)

Actinolepis lemmoni Gray, Proc. Am. Acad. **16**: 102. 1881.
Syntrichopappus lemmoni Gray, Proc. Am. Acad. **19**: 20. 1883.

Boulder, Colorado.

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NEW WESTERN PLANTS

By A. A. Heller

Cakile Californica

A stout glabrous succulent much branched annual, 4 to 6 dm. high, the spread of the branches often exceeding the height: leaves thick and fleshy, oblong-ovate, the largest 8 cm. long, 3 cm. wide, the apex blunt and rounded, the base tapering into the broad petiole, the margins sinuately toothed: sepals oblong, a little over 3 mm. long, over 1 mm. wide, slightly narrowed above but not acute, thick, yellowish, convex on the outside: petals pale purple, 6 mm. long including the claw, blade about 4 mm. long, 2 mm. wide, the claw 2 mm. long, shorter than the sepals, barely 1 mm. wide: filaments stout-filiform, the short ones 3 mm. long, the long ones 4 mm.; anthers bright yellow, about 1 mm. long, oblong, curved: style 4 mm. long, thick, 1 mm. in diameter, with the stigmatic apex very slightly three-lobed: pods about 15 mm. long, without lateral projections at the nodes, the lower joint obovoid, about 5 mm. long, 5 mm. across the top, neither angled nor ribbed; upper joint broadly ovoid, 1 cm. long, 3 mm. across, faintly two-ribbed below, strongly so at the flattened retuse apex.

The type, in my herbarium, is my no. 6856, collected on the beach at Monterey, California, near the railway station, June 29, 1903, the description made from living material. But the shrunken pods in the dried specimen present a very different appearance. In these the lower joint is usually, but not always, 4-ribbed, the upper strongly 4-angled from base to apex, the apex pointed as well as flattened. In the dried state the pod more nearly agrees with the descriptions of *C. edentula*, under which name our plant has been known. In his Flora Dr. Small describes *C. edentula* as having the upper joint 4-angled only near the base, and says the claw of the petal is longer than the blade, whereas in our plant the claw is only half the length of the blade.

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On geographical grounds alone one should not expect *C. edentula* to occur in California, for almost without exception no species native to the Atlantic coast is found here. Through the kindness of Mr. Walter Deane, I have been able to examine fresh fruiting specimens of *C. edentula* from Boston, the type locality, which show that the fruit is smaller and more elongated than ours, with a point twice as long and more slender. The mature pod is about 2 cm. long, the lower joint 7 mm. long, 4 mm. across; upper joint 12 or 13 mm. long, including the beak of 4 mm., the body 7 mm. across, the beak not retuse, merely truncate and narrowed at the apex which is rarely 2 mm. across.

Ribes Suksdorfii

Shrub, probably 1 to 2 meters high, young branches slender and wand-like without bristles, bark grey: infrastipular spines brown, solitary, small, ascending, 5 mm. long or less: leaves thin, broadly ovate in outline, the blade 3 cm. long and as wide, plainly 3 or indistinctly 5-lobed, the sinus between the lobes narrow, margins irregularly toothed, the segments commonly rounded and obtuse, ciliate, the base truncate or slightly cordate, both surfaces pubescent with short semi-appressed hairs, especially the lower; petioles slender, a little shorter than the blades, more or less pubescent: peduncles proper slender, drooping, 15 mm. or less in length, 3-flowered, glabrous: a rounded ciliate bract at the base of each pedicel, two nearly equal pedicels springing from the first bract, one of them forked about 5 mm. above the base, where there is a second bract from which arises the third pedicel, also bearing a bract about 5 mm. from the base: calyx greenish on the outside except the purple edges of the lobes, about 8 mm. long commonly glabrous on the outside except sometimes for a few hairs on the outside of the lobes, the tube narrowly funnelform, 3 mm. long, 2 mm. wide across the top, pubescent within, the finally reflexed lobes oblong, 5 mm. long, 2 mm. wide, blunt and rounded at apex, purplish or dull red on the inside: petals white or pinkish, 3 mm. long, 1 mm.

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wide at base, 2 mm. wide across the top, the edges somewhat inrolled: stamens exserted 2 mm. from the unreflexed calyx, anthers oblong, 1 mm. long: style commonly a little exceeding the stamens, 2-parted down almost to the petals, densely villous for nearly its entire length: ovary glabrous.

The type, in my herbarium, was collected somewhere in Washington in 1897 by Mr. W. N. Suksdorf, to whom I take pleasure in dedicating the species. It is part of a consignment of several species collected for me in quantity by Mr. Suksdorf and laid aside for the past ten years, the record which accompanied the plants apparently lost. The plant is no doubt from the eastern slope of the Cascades near the Columbia river in Klickitat county, as I think Mr. Suksdorf resided at White Salmon at that time.

It is related to *R. divaricatum*, but differs from that species in the absence of "bristle shaped prickles" on the young branches; in having only a single small straight ascending spine instead of "one or three large, strong, deflexed prickles under each bud;" the leaves are not "smooth and veiny;" the calyx is hardly "bell-shaped," and the petals are narrower with a more claw-like base than those of *R. divaricatum*, which apparently is restricted to the wet country on the west side of the Cascade mountains.

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EDITORIAL

After nearly seven years as a private enterprise, devoted almost exclusively to my own writings, I have decided to throw this journal open to the botanical public rather than start a new publication, for I am convinced that a journal such as I hope this one may become is badly needed.

A great many people are interested in plants—just plain ordinary plants that grow in the woods and fields—but are not interested in the learned papers which are worked out in the laboratories of our institutions of learning. It is our intention to exclude all such highly technical articles, and keep the publication as it has been from the beginning, a journal devoted to systematic botany. And furthermore, we intend to deal only with flowering plants, and perhaps ferns, although the *Fern Bulletin* should properly be the medium for publication on the latter. There are journals devoted exclusively to cryptogams, and they should be able to take care of all that is written in their particular lines, the *Bryologist* dealing with mosses, hepatics and lichens, and the *Journal of Mycology* with fungi.

There may be some who object to articles taken up by the descriptions of new species. The making of new species is a necessary evil, for many parts of our vast country are imperfectly explored, many plants are of local distribution, and each year brings out new species as new territory is looked into, old ground gone over more thoroughly, or the botanical "trash piles" turned over and critically examined. The true botanist and lover of plants derives much pleasure in searching out and knowing the peculiarities of the different species with which he comes in contact, and the more he does of this, especially in the field—for no true study of plants can be carried on without intimate field knowledge—the more he finds to segregate.

This brings us to an important point. The man who goes out and communes with nature, be he professional or amateur, sees things, and is very liable to discover new facts about old

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plants. He may find them growing under unusual conditions, or out of their recorded range, or some character may be exhibited which he does not find in descriptions. The things he may discover are legion, and the discoveries should be recorded. We should be pleased to furnish the medium for imparting them to others.

Now something about MUHLENBERGIA, its origin and name. The writer, like many others, had articles to publish, and sometimes had to do considerable engineering in order to have space granted for them, to say nothing of delays in printing. He therefore began to plan a magazine exclusively for and by himself. For at least a year before the first number appeared in 1900, he had decided upon the name. To western botanists especially the name of Muhlenburg is scarcely known, but he was one of the foremost botanists of the early part of the century just closed. His writings were less voluminous than those of some of his contemporaries, only two volumes having been published, one the "Catalogue" occasionally cited in works on eastern botany, the other the "Descriptio uberior Graminum et Plantarum Calamarium," published in 1817, the year after his death.

He was a Lutheran minister, for many years pastor of Trinity church in Lancaster, Pennsylvania, the city in which I had my home for about twenty years, where my first love for plants and things botanical was engendered, and what more fitting than that I should thus commemorate the name of the pioneer whose favorite haunts I no doubt visited, and gleaned many treasures from the places where he also found his, some of them species which bear his name as author.

Professor P. B. Kennedy, of the University of Nevada, at Reno, Nevada, is to be greatly congratulated upon his forthcoming monograph of the species of the genus *Trifolium* which occur in this country north of Mexico. It is to be not only a monograph in the botanical sense, but will also deal with the

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economic possibilities of the various species. Each species will be illustrated by a plate showing the entire plant as well as enlargements of the floral parts made from camera lucida drawings. It is an undertaking which should have the hearty cooperation of all botanists in every way possible. *Trifolium* is a large genus, about 150 species, mostly native, occurring north of Mexico, and all but 15 of them are found from the Rocky mountains westward. Over 80 of the total number are found in California, many of these not occurring beyond the borders of the State, and a large proportion of restricted range. In 1876, in Proc. Am. Acad. **11**: 127-131, Watson gave a short synopsis of the genus, listing 39 species. Since that time no attempt has been made to treat the genus as a whole, but many species have been described in scattered publications. As a result, the determination of species in the genus is difficult, and Professor Kennedy's work will be of incalculable benefit.

The good people of our sister State of Nevada will be surprised to learn that they have been annexed to California. We here in California have had nothing to do with the matter, so they must look to Europe, where the act was consummated, for redress. In the Bulletin de la Societe Royale de Botanique de Belgique, **42**: 183-200, July 10, 1906, just received, Michel Gandoger has a paper on the genus *Eriogonum*. He cites eighteen species and varieties from Nevada, and without exception Nevada is credited with being a part of California. The following are some of the anomalies: "California, sierra Nevada ad Reno;" California, in sierra Nevada ad Wadsworth;" "California. Stampede Ecklo Co, in sierra Nevada," intended for "Stampede, Elko county, Nevada," a point many miles to the eastward of the Sierra Nevada. Another novelty is "California, in regione Nevadensi ad Sierra Walley." This looks as if California may have been dumped into Nevada. Whatever its intended meaning, the true interpretation is evidently "California, in the Sierra Nevada, in Sierra valley," which is in Sierra

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county. It seems to us that when a botanist undertakes to describe plants from a country with the geography of which he is totally unfamiliar, he should consult a reliable atlas, or at least give the data on the labels and nothing more.

If the work were a monograph with complete and accurate keys, the short descriptions might suffice, but there are no keys, and we fear that if the new species and varieties are to be recognized at all, it is because in most cases numbered specimens from well-known collections are cited as the types. There are also some deliberately coined homonyms. On page 186 occurs *E. alatum* var. *Macdougalii*, while *E. Macdougalii* appears on page 191; *E.* "*anemophyllum*" Greene, var. *Cusickii*, page 186, and *E. Cusickii*, page 183; *E. nevadense*, page 188, *E. ovalifolium* var. *nevadense*, page 193, and *E. umbellatum* var. *nevadense*, page 188; *E. Cusickii* var. *californicum*, page 198, and *E vimineum* var. *californicum*, page 199. Should the plants which these homonyms represent prove worthy of names, there is an opportunity for some American botanist to assign other names to them, as well as fully describe them.

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Application for entry as second class matter at the post office at Los Gatos, California, filed January 30, 1907.

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A. A. Heller, Editor
Box 58, Los Gatos, California.

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Volume 3 February, 1907 Number 2

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, FEBRUARY 28, 1907

BOTANICAL FEATURES AROUND RENO

BY P. BEVERIDGE KENNEDY

Reno is situated in the Truckee Meadows at the base of the foothills on the east side of the Sierra Nevada mountains, and lies in latitude 39 degrees 31 minutes N., longitude 119 degrees 48 minutes W. The surrounding country is rich from an agricultural standpoint, alfalfa being the chief product. Much of the land that was at one time in sagebrush and wild hay, is now, by means of draining the low lands and irrigating the foothills, made to produce two or three crops of alfalfa annually. The valley extends by a narrow arm twelve miles long to Verdi, where the eastern Sierras rise abruptly with little or no foothill region, from 4500 to 7000 feet. It is at this point that the Truckee river, famous for its beauty, its fish, and, more recently, the Carson-Truckee reclamation project, enters the valley and wends its way to Reno. The city is practically dependent upon the Truckee for its light, water, gas and power, as well as for all the water used for irrigation purposes. The river is somewhat unique in that it flows out of one of the most picturesque lakes in the world, Lake Tahoe, situated in a basin of the high Sierras at an elevation of 6225 feet. From this outlet it flows through the coniferous forests in a north, northeasterly, and then

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again in a northerly direction until it reaches the Truckee Valley at the small lumbering town of Verdi. From there to Reno its banks are bordered with the delightful green of the alfalfa fields. Leaving Reno it passes along through the railroad town of Sparks, and through immense native hay meadows to the first range of mountains characteristic of Nevada, the Virginia mountains, at whose summit the famous Virginia City with its Comstock mine is snugly nestled. It breaks through these mountains at the Truckee Pass, so frequently spoken of by Watson in the Botany of the Fortieth Parallel. After leaving the mountains it enters a broad, hot sandy plain, where it turns northward and flows between high banks to Pyramid lake. It is on these sandy plains near the Big Bend of the Truckee that many of the new species described in the Botany of the Fortieth Parallel were collected. At a distance of about sixteen miles from the Big Bend the stream divides, one large branch emptying into Pyramid lake, and a smaller one flowing eastward into Winnemucca lake. The combined area of these two lakes is about five hundred square miles, with an elevation of 3880 feet above the level of the sea. The water entering these lakes can escape only by evaporation. It is somewhat alkaline, but nevertheless abounds in very large native trout.

Now that we have given a general idea of the position of Reno to the surrounding country, let us return to the Truckee Valley and mention some of its botanical features. The valley, with its arm stretching out toward the west, is surrounded by mountains. The eastern Sierra Nevada mountains extend along the western side of the valley, and rise by a graduated series of sagebrush foothills to an elevation of about 7000 feet, terminating at the extreme southwest in Mount Rose, with an elevation of 10800 feet, and looking down on the magnificent blue waters of Lake Tahoe. The Virginia mountains extend along the eastern side of the valley at an elevation of about 6000 feet, the highest peak, Mount Davidson, 7870 feet, looking down on Virginia City on its eastern flank.

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The Virginia mountains form a strong contrast to those of the Sierras by their brown and desert-like appearance. From a botanical standpoint they are exceedingly interesting, but have not yet been explored to any extent. The scarcity of springs and the difficulty of packing water make collecting somewhat arduous.

On the south the valley is closed in by an arm extending down from the Virginia mountains and another from the Sierra, which come together at Steamboat Springs, where a score or more of hot water springs boil up from the ground. This is also the type locality of several species mentioned in the Botany of the Fortieth Parallel. The valley on the north is also bounded by two spurs, a low one from the Virginia mountains, and a higher one from the Sierras, the Peavine Hills, which rise to a height of 8270 feet, almost directly north of the city of Reno.

CLIMATE

As the climate of any given locality frequently has much to do with the presence or absence of many species, the following extracts from Bulletin 59, Nevada Agricultural Experiment Station, by S. B. Doten, will be of interest for comparison with other regions:

From the year 1888 up to the present time, the University has kept a record of the most important features of the local climate. A portion of this record is herein presented in a condensed form and published as a bulletin of the Experiment Station because of its importance to the farmers of this vicinity.

Average Temperature by Months and Years

In this irrigated section of the semi-arid west, the temperature of the air is of the utmost importance; there is always too little summer rain to count for anything; the heat of the air helps to determine the amount of water used in irrigation and the rate of plant growth. In the averages for January, for instance, we find in January 1890 an average monthly temperature below 20 degrees; for January 1900, an average of nearly 40 degrees. The average for sixteen Januaries is midway between the two at about 30 degrees. The record for February is equally variable; that for July much more constant.

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Highest Temperature by Months and Years

In December, January and February the reader will note temperatures above 60 degrees; in July and August he will find two records of 100 degrees, the highest ever recorded on the University Hill.

Lowest Temperature by Months and Years

Seventeen years' record of lowest monthly and annual temperatures, shows the curious variability which is characteristic of our climate. A glance at the record of lowest temperatures for January, shows in 1888, in 1890 and in several other years, temperatures far below zero. In January 1896 and January 1900 the minimum remained throughout the month well above the zero mark. The February record of lowest temperatures is of equal interest. There is one record below zero in March, and in ten years out of seventeen we find winter temperatures below the zero mark.

April's record of lowest temperatures is a record of severe frosts. The figures for May show frost for every year except 1894 and 1898.

Precipitation

In 1902, for instance, we had a yearly total of less than five inches of water; in 1893 but little more; in 1904 and in 1891 more than ten inches fell; while in 1890 there fell rain and snow which would amount to over 15½ inches of water on the level. The annual average for the entire seventeen years is 8.20 inches, and this probably comes close to the average annual precipitation for this region.

Snowfall in Inches for Seventeen Years

The bottom line of totals gives but an inch of snow for the year 1900, and over seven feet for 1890, with a yearly average of nearly two feet. This yearly average is somewhat misleading. Two feet of snow distributed through the winter and early spring in squalls and flurries will not usually mean much snow on the level at any one time.

The Truckee Valley may be regarded as having a more humid atmosphere and a larger precipitation by a few inches than the typical valleys of Nevada farther to the east. On this account it may be considered as intermediate between the valleys of middle eastern California and those of central Nevada.

As it is the intention of the writer to refer briefly to the plants growing in the Arctic zone around Mount Rose, some information concerning the climatic conditions found on the summit may be of interest. The information here given is taken from an article written by Professor J. E. Church, Jr., in U. S. Weather Review, 34: No. 6, June, 1906, entitled "The Mount

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Rose Observatory, together with some personal experience on several trips taken during the spring and summer months. It happens that the most complete records of temperature taken on the mountain top represent an unusually mild season, so the following figures may be somewhat misleading, if we were to compare them with the present winter, which has been an exceptionally cold one, the thermometer readings in the valley being usually below zero every night for several weeks.

Continuous records were obtained at the mountain observatory by weekly visits from October 14th to November 29, 1905. During the six weeks the mean daily range was only 13.8 degrees, while that at Reno for the corresponding period was 31.3 degrees. From December 3d to the 11th the mean range was 9.4 degrees; from January 22d to the 30th 7.8 degrees; February 5th to the 13th, and 19th to the 23d, 8.7 degrees; while the corresponding mean ranges at reno were 27, 21.6, and 23.4 degrees respectively. During the months of March and April the relation remained approximately the same, the mean daily range on Mount Rose from March 5th to 12th and 19th to 27th being 9.8 degrees, and from April 8th to 16th and 24th to 30th 10.2 degrees, as against 25.6 and 24.9 degrees respectively at Reno.

MINIMUM AND MAXIMUM TEMPERATURES

Period	Minimum °F.	Maximum °F.
June 29-August 4, 1905	plus 24	71.2
August 4-September 4, 1905	minus 2	70.8
September 4-October 7, 1905	minus 4.5	65.5
October 14-October 30, 1905	plus 7	46
October 30-December 3, 1905	minus 1.8	52
December 3-January 30, 1906	minus 5	48
January 30-March 4, 1906	plus 9	36
March 4-March 18, 1906	plus 3	44
March 18-April 7, 1906	minus 2.5	30
April 7-May 5, 1906	plus 11	44.3
May 5-May 31, 1906	plus 7	49.5
May 31-June 16, 1906	plus 10	45
June 16-June 25, 1906	plus 30	58
June 25-July 14, 1906	plus 22	71

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The temperature records of minus 2 and minus 4.5 degrees would appear to be exceedingly cold for late summer months, as we usually have some of our warmest weather in the valley at that season. Certain it is that the night temperatures are exceedingly variable. While encamped for botanical purposes on the mountain top for two weeks in the latter part of August and the first week of September of 1905 at an elevation of 10000 feet, we were greatly surprised to find that during some nights a thin blanket was more than was necessary to keep us comfortable, while the succeeding night we piled on four heavy blankets, and even then were somewhat uncomfortable. So far as could be observed, the atmosphere was the same, cloudless and still. Enough has been said to give one an idea of the conditions under which the plants on this mountain survive.

GEOLOGY

The mountains surrounding the valley are for the most part composed of rocks of igneous origin, with occasional outcroppings of metamorphic rocks interspersed among them. These consist largely of rhyolite, andesite and granite. The reddish-brown coloring of the mountains on the north and east sides of the valley indicate a preponderance of rhyolite, while the dark gray of the eastern Sierra presents the appearance of andesite and granite formations to a greater extent. At the extreme southern end of the valley, at Steamboat Springs, where hot spring action has been and is still prevalent, there is a mixture of all of the above, making this point especially interesting from the standpoint of plant growth.

The floor of the valley consisting as it does of huge boulders and sedimentary rocks, gives evidence of former river action and the presence of an ancient lake. The outcroppings of diatomaceous rock along several cuts in the railroad would help to substantiate this theory.

I am indebted to Mr. W. S. T. Smith, Professor of Geology, University of Nevada, for verifying the above statements.

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SOILS

The distribution of plants in the valley is greatly influenced by the many different kinds of soils. The foothill region on the west, consisting as it does largely of sagebrush, gives little opportunity for the presence of any considerable quantity of humus in the soil. The sagebrush (*Artemisia tridentata*) being more or less evergreen in character, loses only a few of its leaves at any one time. Owing to the aridity of the region, the fallen leaves become so dry that they are blown away in the form of dust.

The soils on the hills to the north of Reno are sparsely clothed with vegetation and consist largely of rhyolite, which, when decomposed, varies in color from yellowish-white to red, brown, or purple. During the summer this rhyolite has a very fine, soft texture like fine powder, but in winter the particles hold together so tenaciously that in wet weather it is frequently very difficult to drive a two horse wagon along the road. On such soils the characteristic vegetation is *Atriplex confertifolia*, *Cleome Hillmani*, and *Helianthus annuus*.

At higher elevations on the western side of the valley within the timbered area there is a much larger precipitation, and consequently a larger amount of humus produced from the decaying needles of the yellow pine, Douglas spruce, and the leaves of the mountain mahogany and other shrubs of minor importance. Where the granitic soil is plentiful it seems to offer an especial attraction for such plants as *Pinus contorta Murrayana*, *Arctostaphylos patula* and *A. Nevadensis*.

LIFE ZONES

The distribution of the plants occurring in the region according to their life zones must at the present time be considered somewhat uncertain until a more prolonged study with this definite object in view is undertaken. The Austral region is represented in this locality by the Transition and Upper Austral zones, and the Boreal region by the Canadian, Hudsonian, and Arctic-Alpine zones.

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The entire range of hills on the eastern side of the valley, with the exception of the highest peaks, the writer is inclined to include in the Upper Sonoran area of the Upper Austral zone. The common sagebrush is abundant throughout this area in a stunted form. Other common species are:

Atriplex confertifolia	Juniperus Californica Utahensis
Atriplex canescens	Pinus monophylla
Atriplex Nuttallii	Ramona incana
Tetradymia canescens	Sphaerostigma tortuosa
Tetradymia spinescens	Stipa comata
Tetradymia glabrata	Tricardia Watsoni

In the lowest, usually alkaline, localities of the same area we find:

Sarcobatus vermiculatus	Salicornia herbacea
Distichlis spicata	Juncus balticus
Spartina gracilis	Triglochin maritima
Lepargyraea argentea	

TRANSITION ZONE

It is very evident that the plants of this region, occurring within the limits of this zone, must belong to the Arid Transition area as indicated by Merriam in his scheme of classification. There are two distinct belts represented, and we are inclined to follow Piper and Hall and divide the area into an Upper and a Lower Transition area. The Upper Transition area is to be represented by the yellow pine (*Pinus ponderosa*), and the Lower Transition area by the common sagebrush (*Artemisia tridentata*). It is interesting to note that Piper in his Flora of Washington regards *Artemisia tridentata* as more characteristic of the Upper Sonoran area, and includes also several other shrubs which we regard as in the Transition area. There is little doubt but that owing to the ability of the sagebrush to adapt itself to exceedingly variable conditions both of altitude, moisture and soil, that it overlaps both areas so as to be almost inseparable. My observations lead me to believe, however, that

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it is more at home in a moister region than that usually considered as the Upper Sonoran area.

The sagebrush area extended before cultivation over a very large portion of the valley, and it now covers the entire foothill region on the slopes of the eastern Sierras to an altitude of about 6000 feet, where pockets and strips of greater or less extent creep in among the yellow pine forests to elevations of 7000 and even 8000 feet. Unfortunately at the prefent time many square miles of these once luxuriant stretches of timber present only denuded areas save for the countless stumps which still remain to testify to the past conditions of the mountains. These trees were largely used in the early days of the Comstock to timber the mines. Since that time a second growth has been produced, more especially in the canyons, which is just beginning to bear cones. It will be a very difficult matter to reforest the high ridges, as there is no opportvnity for seed to get there, and the soil, for lack of a forest cover, has been severely washed. Another tree typical of the Upper Transition area is the Douglas spruce (*Pseudotsuga mucronata*). It is found scattered throughout the yellow pine belt with apparent indiscrimination, but adhering more closely to the higher slopes. Observations in the canyons seem to indicate that this species is better able to reforest the denuded area than the yellow pine. The sugar pine (*Pinus Lambertiana*) is also met with in this area, but it is never abundant, and more frequently only two or three or at most twenty trees can be found in these canyons. The incense cedar (*Libocedrus decurrens*), although more plentiful in granite regions of the eastern Sierra to the south of the Truckee Valley, is quite scarce here, only a few specimens occurring in well sheltered and rather moist situations in the deep ravines.

The most important shrubs found associated with the yellow pine forests are:

Arctostaphylos pungens	Cercocarpus ledifolius
Arctostaphylos Nevadensis	Ceanothus velutinus
Ribes cereum	Ceanothus prostratus
Castanopsis sempervirens	

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The following plants may also be found, the species varying with the soil:

Phacelia heterophylla	Monardella odoratissima
Arabis pedicellata	Gilia aggregata
Erysimum asperum	Pentstemon deustus
Mertensia Nevadensis	Apocynum sp.

In the sagebrush belt of the Arid Transition area in the higher foothills is accompanied by

Ribes brachyanthum	Kunzia tridentata
Amygdalus Andersonii	Delphinium Andersonii
Zygadenus paniculatus	Paeonia Brownii
Arabis arcuata	Balsamorhiza sagittata
Balsamorhiza Hookeri	Wyethia mollis
Calochortus Nuttallii	Crepis Nevadensis
Gilia aggregata	Castilleja angustifolia

On the gravelly knolls near the level of the valley we find the following species in great abundance:

Ephedra Nevadensis	Chrysothamnus graveolens
Gutierrezia diversifolia	Blepharipappus scaber
Phlox Stansburyi	Layia glandulosa
Collomia gracilis	Rigiopappus leptocladus
Gilia inconspicua	Chaenactis Douglasii
Emmenanthe lutea	Chaenactis Xantiana
Amsinckia intermedia	Allium anceps
Viola Beckwithii	Amsinckia tessellata
Bromus marginatus	Collinsia parviflora
Argemone hispida	Astragalus Purshii
Sphaeralcea ambigua	Astragalus malacus
Erodium cicutarium	Astragalus Andersonii
Gayophytum racemosum	Astragalus obscurus
Mentzelia albicaulis	Astragalus Mortoni
Mentzelia gracilenta	Astragalus iodanthus
Lomatium villosum	Valerianella congesta
Lomatium Nevadense	Piptocalyx circumscissa
Pectocarya penicillata	Piptocalyx dichotoma

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Pentstemon violaceus	Erigeron aphanactis

In sandy waste places throughout the same belt we find:

Conanthus aretioides	Viola senecta
Coldenia Nuttallii	Lupinus malacophyllus
Oenothera caespitosa	Eatonella nivea
Chylisma scapoidea	Anisocoma acaulis
Nemacladus ramosissimus	Abronia crux-maltae
Gilia nudicaulis	Muilla transmontana
Eriocoma cuspidata	Leucocrinum montanum

In waste places throughout the city *Iva axillaris* and *Marrubium valgare* are common plants, while the borders of the streets are densely covered with *Sophia incisa* and *S. pinnata*. *Bromus maximus*, *B. rubens*, *B. racemosus*, and *B. tectorum* also occupy considerable areas along embankments, but always near the railroad or highways. *Hordeum jubatum* and *Cuscuta epithymum* are common pests in the alfalfa fields. In a few places *Elymus triticoides* also subsists under very unfavorable conditions as to soil and moisture. A plant which may be considered rather rare in the valley is *Eschscholtzia leptandra*. So far this plant has been found in the valley only along the railroad track near Verdi in the foothills of the eastern Sierras. The writer has found it, however, about fifty miles north of Reno in a very remote locality and about twenty-five miles eastward from the Sierra Nevada mountains. It may be considered a good Great Basin plant.

Eschscholtzia micrantha, the same plant as is mentioned in the Botany of the Fortieth Parallel as *E. minutiflora*, is found only at Truckee Pass and points outside the valley north and east in the desert country. The following thistles are all found within the region but never abundantly: *Carduus Nevadensis*, *C. Drummondii*, *C. canescens*, *C. Andersonii*.

Forsellesia Nevadensis occurs in a few scattered localities, usually in the low foothills, but the plants are so severely browsed on by stock that it was only recently that the writer was able to secure a flowering specimen which had drifted into

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a protected canyon. *Eriocoma Webberi* is also a rare grass. It occurs at the base of rocky promontories in the foothills north of Reno. *Melica stricta* and *M. fugax madophylla* are frequent in the pockets of soils on the sides of rocky canyons, while the following blue-grasses are quite abundant throughout the sagebrush areas in certain suitable soils: *Poa Fendleriana*, *Sandbergii*, *Nevadensis*, *Buckleyana*, *laevigata*. In early spring *Festuca microstachya* covers the ground wherever there is a space left for it underneath the sagebrush and other plants. A *Sitanion* near *S. flexuosum* Piper, is plentiful in rocky situations, but the tufts are never in close proximity. *Allium atrorubens* is not an uncommon plant in dry places in the foothills, while *A. parvum*, also inconspicuous, prefers hard ground among the sagebrush. *Allium anceps*, by far the most abundant of the onions, occurs in large patches of an acre or less in extent on the rhyolite hills to the north, giving them in early spring the appearance of grassy slopes. *Fritillaria pudica* occurs in a few places in the foothills near Verdi, and is, in all probability, a visitor from the Sierras. *Lewisia rediviva* evidently comes in from the north and seems to thrive if given plenty of sunshine in poor rocky soil where the sagebrush has a struggle.

SWAMPS AND MEADOWS

Many hundreds of acres in the Truckee Valley are still under water in winter time, a large proportion partially drying out by evaporation during the summer months. The lowest portion consists of a dense wilderness of *Typha latifolia*. On the borders of this belt we find *Sagittaria latifolia*, *Sparganium simplex*, and in moist localities where there is more or less alkali present, *Scirpus Nevadensis* and *Distichlis spicata*. In strongly alkaline localities, where a white crust forms on the ground during the summer, the more common plants are *Salicornia herbacea*, *Sarcobatus vermiculatus* and *Dondia diffusa*. The remaining portions somewhat higher up are used for the production of native hay and are irrigated by flooding several times during the summer. The following species are found in greater

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or less quantities according to the condition of the soil and the amount of water that the plants receive:

Juncus balticus	Carex athrostachya
Juncus bufonius	Carex aquatilis
Juncns longistylis	Carex lanuginosa
Juncus Nevadensis	Carex marcida
Juncus xiphioides	Carex Nebrascensis
Carex ampullacea	Eleocharis arenicola
Triglochin maritima	Eleocharis palustris
Scirpus lacustris	Scirpus occidentalis
Scirpus microcarpus	Trifolium spinulosum
Poa Nevadensis?	Poa laevigata?
Poa sp.	Cyperus inflexus?

These meadows and swamps are very similar in many respects to those occurring in other parts of the State along the Humboldt river. The main striking difference is the absence of *Elymus triticoides* and *E. condensatus*. Until further study is made it is difficult to state whether they belong to the Lower Arid Transition area or to the Upper Sonoran.

CANADIAN ZONE

At the upper limits of the yellow pine forests we find many small meadows which are surrounded by dense groves of magnificent specimens of the Murray pine (*Pinus Murrayana*). It seems to be necessary for it to have plenty of moisture, hence it remains at elevations of from 7000 to 9000 feet. There are also two other species that occur in such limited quantities that they are of great interest. On a protected slope facing the north and very precipitous, but well covered with snow until very late in the season, we find a grove of alpine hemlock (*Tsuga Mertensiana*). The slope is well protected from the arid winds of the east by a high ridge, and the south sun never strikes it. Somewhat lower, but also in a protected canyon, a few trees of *Pinus monticola* have been discovered among the yellow pines.

This zone is so scattered and of such limited extent that it would be difficult to give a list of plants that could not be found

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in either the Hudsonian zone above, or the yellow pine belt below.

HUDSONIAN ZONE

Ascending Mount Rose at an elevation of between 9100 and 9200 feet, we have a contact of lava and granite. At this point the white bark pine (*Pinus albicaulis*) is the only tree. It produces a trunk up to the 10000 foot contour, and from there on to 10600 feet it produces only prostrate branches. It was interesting to find these laden with cones. The gravelly meadows of the open spaces among these pines are profusely covered with many different species of plants. The following list is given without attempting to define the exact localities of the different species: *Senecio triangularis*, *Cystopteris fragilis*, *Solidago multiradiata*, *Ligusticum Grayi*, *Raillardella Nevadensis*, *Sibbaldia procumbens*, *Antennaria dioica*, *Ribes lentum*, *Erigeron ursinus*? *Rhodiola integrifolia*, *Stipa occidentalis*, *Polygonum Shastense*, *Pentstemon chionophilus*, *Eriogonum Lobbii*, *Pedicularis attolens*, *Eriogonum marifolium*, *Mimulus primuloides*, *Lupinus leucophyllus*. *L. cytisoides*, *L. Lyallii*, *Stipa occidentalis*, *Trifolium monanthum*, *Poa reflexa*, *P. Byckleyana*, *P. Sandbergii*, *P. Olneyi*, *Agrostis Rossae*, *Phleum alpinum*. This was the upper limit of *Trifolium monanthum*. It occurs in great quantities in the meadows at 8000 feet. The characteristic willow of this region is *Salix glaucops*.

ARCTIC ZONE

The writer is inclined to regard the Arctic zone as beginning at the limit of trunk growth of the white bark pine, as the Arotic willow (*Salix petrophila*) occurs at this point. The character of the soil also changes from granite to andesite, bringing us again into the lava region. In addition to the prostrate form of *Pinus albicaulis*, already spoken of, we find the following, given in the list according to their elevations from 10000 to 10800 feet: *Salix petrophila*, *Raillardella Nevadensis*, *Astragalus Whitneyi pinosus*, *Dasiophora fruticosa*, *Cerastium Behringianum*, *Arenaria acuteata*, *A. Nuttallii*, *Oxyria digyna*,

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Senecio occidentalis, *Festuca ovina supina*, *F. Kingii*, *Poa longipedunculata*, *Trisetum subspicatum molle*, *Sitanion brevifolium*, *Polemonium Montrosensis*, *Gilia pungens*, *Phlox condensata*, *Gilia montana*, *Pentstemon Davidsonii*, *Castilleja inconspicua*, *Eriogonum rhodanthum*, *E. rosensis*, *Phlox dejecta*, *Erigeron*, n. sp., *Ribes Churchii*, *Draba Lemmoni*, *D. densifolia*, *Arabis depauperata*, *Chrysothamnus monocephala*.

The summit of this mountain is subject to winds of great velocity at all seasons of the year. During snowstorms the wind nearly always blows so that for a distance of about 200 feet little or no snow is allowed to remain except in the crevices of the rocks. In summer these winds tend to exaggerate the xerophytic conditions, and the plants which survive must therefore be armed with a greatly reduced leaf surface, a well developed root system, a dense pubescence, and abundant secretions from the glands. As will be shown by referring back to the table of temperatures taken on Mount Rose, there is usually a great variation between night and day. The writer has seen plants on the summit of the mountain which, when in flower, have been subjected to a temperature of zero, the next day lift up their heads and continue to bloom for several weeks. It seems probable then that the above mentioned characters must be produced just as much against cold, as against excessive transpiration and heat.

An interesting problem, not yet wholly worked out, is the conditions of the mountain on the south side. Approaching from the northeast, through the regions already referred to, and arriving at the summit, we look down a precipice fully exposed to the sun's rays. It extends down almost perpendicularly from 10800 feet to the creek below, which is at 8000 feet. Clinging to the steep sides we find junipers within fifty feet of the summit. The writer is inclined to believe that even at this high altitude it represents a small portion of the Upper Sonoran belt, which has become isolated. It is our intention to make a detailed study of the mountain from all sides as soon as the opportunity presents itself.

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STREAMS

The course of the Truckee river from its source in Lake Tahoe to Pyramid Lake has already been outlined. Its banks through the Truckee Valley are thickly covered with a dense growth of a form of *Populus balsamifera*, *P. trichocarpa*, *Salix argophylla*, *S. laevigata*? *S. lasiolepis*, *S. padophylla*, and *Alnus rhombifolia*. *Populus tremuloides* occupies large areas along the streams in the yellow pine belt, where it produces mere saplings or underbrush. In the fall these golden patches around the springs are very striking from Reno. At lowest elevations it forms a good sized tree, but it is not abundant in the valley. *Populus Fremontii* takes the place of all other poplars in the more desert region beyond the Virginia mountains. Near Pyramid Lake there is a good sized forest of it, the trees very large. Along the banks of the river we find *Rosa Woodsii*? *Prunus demissa*, *Ribes aureum*, *R. tenuiflorum*, *Mimulus Langsdorfii*, *Cicuta vagans*, *Phacelia ramosissima*, *Vicia linearis*, *Artemisia aromatica*, *A. Kennedyi*, *Allium acuminatum*, *Erigeron Canadensis*, *Epilobium paniculatum*, *Asclepias speciosa*. At higher elevations than the valley, some of the creeks coming down from the melting snow have the following species in limited quantities: *Acer glabrum*, *Alnus tenuifolia*, *Amelanchier Cusickii*, *Ribes cereum*, *R. viscosissimum*, and *Rubus Nutkanus*. Many of the species that occur along the Truckee, such as *Populus tremuloides*, *P. balsamifera*, and the willows, extend up the creeks to about 7000 feet elevation.

This meager outline will be of considerable interest if read in conjunction with the following excellent publications on phytogeography:

Parish, S. B. A Sketch of the Flora of Southern California. Bot. Gaz. **36**: September and October, 1903.

Hall, H. M. A Botanical Survey of San Jacinto Mountain. Univ. Cal. Pub., Bot. **1**: 1-140. *pl. 1-14*. June 7. 1902.

Piper, C. V. Flora of the State of Washington. Cont. U. S. Nat. Herb. **11**: 1906.

University of Nevada, Reno, Nevada.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—I

By A. A. Heller

In order to meet a demand for information about our local flora, I have decided to issue a series of papers describing in a general way the plants which occur about us, at first mentioning only those which are found in the vicinity of Los Gatos, but eventually including the whole county.

Santa Clara county should furnish a highly interesting flora owing to its diversified features. Although one of the richest valleys in the State, the Santa Clara valley consists of less than half of the total area of the county, and from the botanical standpoint this is fortunate, for the highly cultivated orchard lands now yield comparatively few species where once there must have been a vast wealth of forms, some of them no doubt extinct at the present time. The uncultivated areas are the places to which we must look for representatives of our native plants.

The northern part of the county touches San Francisco bay, and furnishes a considerable area of marsh lands.

The eastern boundary is the summit of the inner Coast Range overlooking the San Joaquin valley, and this large extent of foothill and mountains lying east of the valley has scarcely been explored botanically. Mt. Hamilton with an elevation of 4209 feet, the highest mountain in this part of the State, is one of the features of the landscape.

From San Jose to the southern end of the county the valley is comparatively narrow, probably not over six or seven miles wide in most places, for here the Mt. Hamilton range and the Santa Cruz mountains draw close together.

The western boundary is the summit of the Santa Cruz mountains, the highest peaks of which either lie partly in or near the county limits.

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This rough sketch of the geography of the county will give some idea of what may be expected botanically, for in the foothills and mountains, which comprise so much of the county's territory, is where we will find the most interesting plants.

At first we shall take up the flora by months, and it is our intention in the very near future to illustrate at least one species each month.

JANUARY

Owing to the lateness of the fall rains, and the long-continued cold and wet weather after the rainy season did begin, the number of species found in bloom during January this year was small. Two years ago when we had an exceptionally favorable season, some of these species began to bloom in October.

UMBELLULARIA CALIFORNICA (H. & A.) Nutt. *Mountain laurel. Bay.*

This beautiful tree is common in many places in the mountains of California, extending into southwestern Oregon. It has also a considerable altitudinal range, occurring at elevations of between about 600 and 5000 feet. It prefers a moist soil, and is most common in and along ravines near mountain streams. It is a graceful tree, often thirty or forty feet high, not widely branched, the bark smooth and gray, the evergreen leaves thick and leathery, four or five inches long, about an inch wide, bright green and glossy. The small, shallow cup shaped greenish yellow flowers are gathered in numerous little ball-like clusters, and present a very pleasing appearance in their setting of green. In our vicinity thick clumps of young saplings are common on the hills west of the town. The wood as well as the leaves is aromatic, hence one of the common names, bay tree. The fruit is not unlike that of the olive in appearance, and is ripe in the fall, usually in November or December. It is a member of the Lauraceae or laurel family, a family not well represented in temperate regions.

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RIBES MALVACEUM Smith. *Red currant.*

This is common in the hills about Los Gatos, growing among other shrubs, especially on cool northerly slopes. It is a shrub three to six feet high, the slender branches usually erect and little branched, but occasionally much branched and bushy. The leaves are thick, rough and dull green above, whitened beneath with short woolly hairs. The flowers are pale rose, the calyx, as in all members of this genus, being the showy organ. It is a little over a quarter of an inch in length, tubular in shape, the short rounded lobes rotately spreading, or standing almost at right angles with the tube. The small petals are white, and extend a little above the calyx tube, forming a collar-like projection. Its flower characters, as well as the thick rough leaves easily separate this species from its relatives, with one of which, *Ribes sauguineum*, it has been confused by some botanists. The original was "gathered in California by Mr. Menzies" probably between 1790 and 1795. That he got it at Monterey seems unquestionable, as the species is common in the woods at that place. Monterey county is probably its southern limit, and it does not extend much farther north than San Francisco. In our neighborhood it ranges at between 500 and nearly 2000 feet elevation. In the southern part of the State its place is taken by *Ribes indecorum* Eastwood, originally collected at San Diego, but found as far north as San Luis Obispo county. This has a leaf considerably like that of our species, but the flower is smaller and shows different characters.

GARRYA ELLIPTICA Dougl. *Silk-tassel tree.*

An evergreen shrub or small tree, usually six to ten feet high, the branches somewhat spreading. The thick leaves are deep green above, densely clothed underneath with short woolly hairs, the margins more or less crinkled or undulate. The staminate flowers hang from the branches in tassel-like clusters four to six inches in length. When fresh they are pale yellow-or straw-color, but turn gray and dull with age. The arrangement

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of these flowers is rather peculiar. The common flower stalk is slender and thread-like, bearing at short intervals inverted cup-like bracts, from each of which hangs the cluster of from one to three small flowers. The shrub is found here and there among the brushwood on our hills, especially on northerly slopes. It occurs along the road leading to the summit of the ridge above our own place west of the town. Its range is northward from Monterey to Oregon, in the coast region. The original, collected by Douglas, no doubt at Monterey, is the type of the genus, and of the family Garryaceae.

SOLANUM UMBELLIFERUM Esch. *Nightshade.*

This is found in damp soil, usually in ravines or on the edges of thickets in fields among the hills, less rarely in thick woods, as it seems to prefer the sunshine. The stems are almost woody below, but entirely herbaceous and often weak above, leaning upon other plants for support. It is three to five feet high, sometimes quite thick and bushy, with numerous branches. The leaves are dark green, an inch or two long, about three-quarters of an inch wide, blunt and rounded. The flowers grow in clusters of a half dozen or more, each on a slender stalk about an inch in length. The flower itself is saucer-shaped, about an inch in diameter, pale violet-purple. The large yellow stamens are closely pressed together at the middle of the flower, and add to its attractiveness. It is found only in the outer Coast Range from perhaps Santa Cruz northward into Sonoma county. It is a member of the Solanaceae or nightshade family.

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Volume 3 March, 1907 Number 3

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
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Volume 3 No. 3

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, MARCH 28, 1907

NEW SPECIES OF IPOMOEA FROM MEXICO AND CENTRAL AMERICA

BY HOMER D. HOUSE

Various periods of study upon the Convolvulaceae in the herbaria of the New York Botanical Garden and the U. S. National Museum during the past four years has shown that the American tropics are rich in undescribed and local species. Especially is this true of Mexico, from which country many species were described by early writers, and which are awaiting rediscovery. Before any satisfactory revision of the genus *Ipomoea* can be made, the types of the species described by Choisy, Martin and Galleoti, and others, must be studied. The following species have been carefully compared with descriptions of species which await rediscovery, and only those are here presented which do not conflict with existing descriptions, specimens of which have not been seen:

IPOMOEA EMITICA Choisy, in DC. Prodr. **9**: 376. 1845.

I. sagittata Moc. & Sesse; Choisy, l. c. as syn.

I. caudata Fernald, Proc. Am. Acad. **36**: 498. 1901.

Choisy's description is brief, but seems to be identical in all critical characters with *I. caudata.*

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IPOMOEA PARASITICA (H. B. K.) G. Don, Gen. Syst. **4**: 275 1838.

Convolvulus parasiticus H. B. K. Nov. Gen. et Sp. **3**: 163. 1818.

I. circinnatus Willd.; R. & S. Syst. **4**: 302. 1819.

I. perlonga Robinson, Proc. Am. Acad. **29**: 319. 1894.

Distribution: Lower California, western and southern Mexico to Costa Rica, and Venezuela. Described from near Caracas.

IPOMOEA HIRTIFLORA Mart. & Gal. in Bull. Acad. Brux. XII. **2**: 267. 1845.

Type locality: "Crescit in Mexico in sylvis Chinantla, altitudine 2000 ped."

A specimen in the National Herbarium collected by E. W. Nelson near Jacaltenanjo, Guatemala, altitude 3500-5400 feet (no. 3579), December 18-19, 1895, seems to agree with the original description of *I. hirtiflora*.

Ipomoea Domingensis (Desr.)

Convolvulus major polyanthos Sloan, Jam. **1**: 153. *pl. 97. f. 2.*

C. niveus polyanthos Plum. Am. 78. *pl. 89. f. 2.*

C. corymbosus L. Syst. Ed. 10, 923. 1759.—Sp. Pl. Ed. 2, 225. 1763.

C. Domingensis Desr. in Lam. Encycl. **3**: 554. 1789.

C. sidaefolius H. B. K. Nov. Gen. et Sp. **3**: 99. 1818.

C. multiflorus H. B. K. l. c. 100.

C. laevicaulis Willd. in R. & S. Syst. **4**: 303. 1819.

Ipomoea sidaefolia Choisy, in Mem. Soc. Phys. Genev. **6**: 459. 1833. In D. C. Prodr. **9**: 372. 1845. Not *I. sidaefolia* Schrad. 1821.

I. corymbosa G. Don, Gen. Syst. **4**: 274. 1838. Not *I. corymbosa* Roth, 1821.

I. cymosa Lindl. Bot. Reg. *pl. 24.* 1843. Not *I. cymosa* R. & S. 1819.

I. Burmanni Choisy, in D. C. Prodr. **9**: 350. 1845.

I. Antillana Millsp. Field Col. Mus. Bot. **2**: 84. 1900.

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This much named species is most abundant in the West Indies, but ranges from the Florida Keys and southern Texas to Mexico, Central America and Brazil.

IPOMOEA TILIACEA (Willd.) Choisy, in D. C. Prodr. **9**: 375. 1845. Hallier, f. in Bull. Soc. Bot. Belg. **37**: 95. 1898.

Convolvulus tiliaceus Willd. Enum. **1**: 203. 1903. R. & S. Syst. **4**: 273. 1819. Schlecht. in Linnaea, **6**: 739. 1831.

C. fastigiatus Roxb. Hort. Beng. 13. 1814. Fl. Ind. **1**: 468. 1820.

Ipomoea cymosa G. F. W. Mey. Fl. Esseq. 99. 1818. Not *I. cymosa* Roth, 1821.

C. essequebensis Spreng. Syst. **1**: 600. 1825.

I. fastigiata Sweet, Hort. Brit. Ed. 2, 288. 1826. Choisy, in Mem. Soc. Phys. Genev. **6**: 466. 1833.

This species, commonly known under the name of *I. fastigiata* is distributed from southern Florida and the West Indies to Central America and tropical South America. Willdenow's name is based upon an American plant while that of Roxbury's is based upon a plant of India, and the two may not be identical.

If *I. platanifolia* R. & S. (Syst. **4**: 220. 1819), which is based on *Convolvulus platanifolius* Vahl. (Symb. **3**: 26. 1794) should be the same, and it is usually referred to *I. fastigiata* Sweet, then this species would take the name *Ipomoea platanifolia* (Vahl.) R. & S.

Ipomoea Jaliscana

Ipomoea stans var. *hirsuta* Robinson, Proc. Am. Acad. **29**: 319. 1894. Not *I. hirsuta* R. Br. 1810.

Related to *I. stans* Cav., but very distinct from that species by its conspicuously hirsute stem and leaves, the blades sessile, relatively broader and more inclined to be lobed toward the base; sepals shorter than in *I. stans*, only 6-8 mm. long, suborbicular.

Mexico: Jalisco, Rio Blanco, Dr. Edw. Palmer (no. 324), 1886; plains near Guadalajara, Pringle (no. 4488), 1893.

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Ipomoea divergens

Related to *I. leptoloma* and of about the same size and habit. Leaf segments much broader, sinuately toothed or even lobed, only the lateral segments of the blades sometimes entire, all rounded or obtuse at the ends; sepals more acuminate than in *I. leptoloma*, glabrous: the petioles usually longer than the middle segment of the leaf blades.

Mexico: Guayamas, Sonora, Palmer (no. 231) 1887. Type in the herbarium of the U. S. National Museum.

Ipomoea spirale

Related to *I. Wrightii* A. Gray, from which it differs chiefly in its long tendril-like peduncles, a feature which so far as I am aware has not previously been noted in this genus.

Annual, slender, glabrous and climbing: leaf blades divided into 5 narrowly lanceolate or linear-lanceolate segments, these entire, 1-2.5 cm. long; petioles shorter than the middle segment: peduncles exceeding the subtending leaves, 4-8 cm. long, filiform, spirally twisted or tendril-like in the middle and used in climbing, 1-2 flowered, the pedicel portion 3-4 mm. long and slightly thickened: sepals unequal, oblong, the outer shorter, about 4 mm. long, verrucose, the inner 5-6 mm. long: corolla 10-14 mm. long, cream-colored with a purple throat, the limb 5-angled, 8-10 mm. broad.

Mexico: Jaqui river, Palmer (no. 24), 1864. Type in the herbarium of the U. S. National Museum.

Ipomoea valida

Related to *I. pedatisecta* Mart. & Gal., but distinguished from that species chiefly by the larger corolla with a much longer and more slender tube and the broader leaf segments.

Annual, glabrous, slender and twining, 10-30 cm. long: leaf blades 5-9 divided, the segments oblanceolate, blunt, 1-3 cm. long, separated nearly to the petiole: peduncles exceeding the subtending petioles, 3-4 cm. long, usually 1-flowered, the pedicel portion 15-20 mm. long: sepals unequal, inner ones longer,

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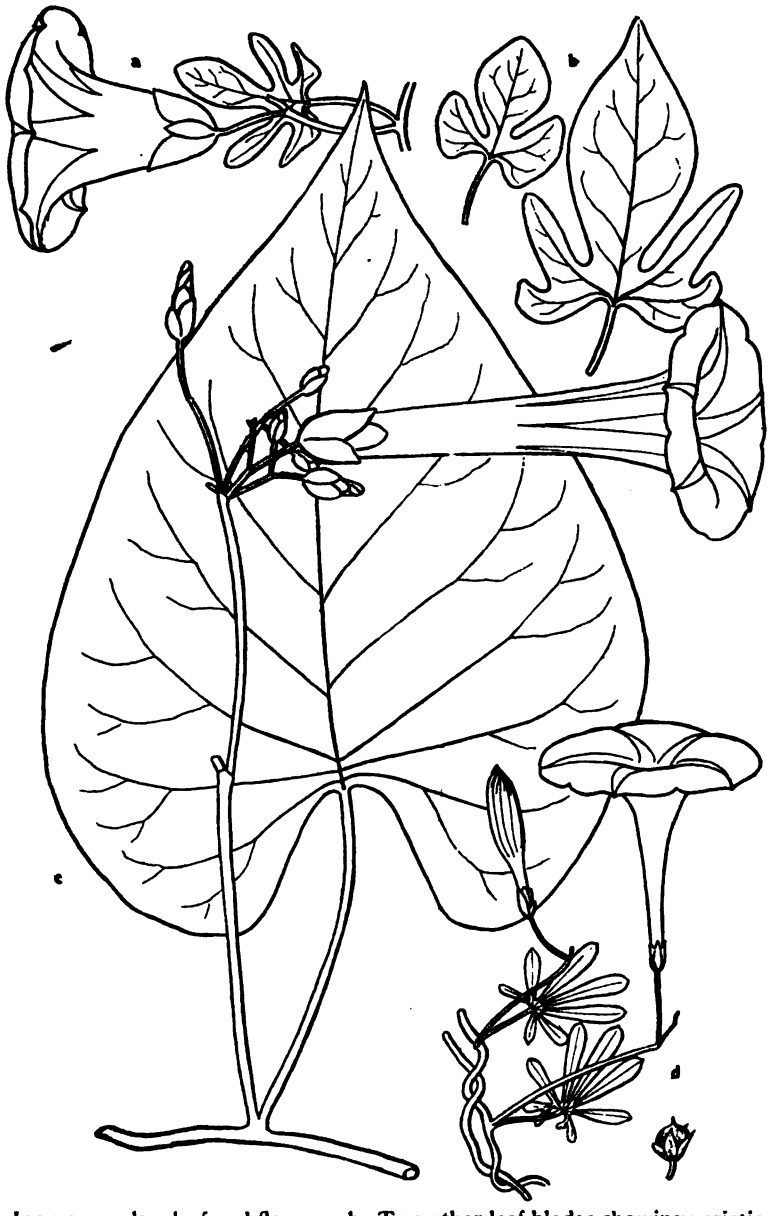

a. Ipomoea vulsa, leaf and flower. b. Two other leaf blades showing variation in size and shape. c. Ipomoea Wilsoni. d. Ipomoea valida. (All figures slightly less than natural size.)

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5-7 mm. long, oblong-lanceolate, acute: corolla purplish, about 5 cm. long, tube very slender, 2-3 mm. thick above the calyx, expanding into a subentire limb nearly 5 cm. broad: capsules subglobose, about 6 mm. in diameter, 2 celled, 4-seeded: seeds smooth and black.

Mexico: Manzanillo, Palmer (no. 1031), 1890. Type in the herbarium of the U. S. National Museum.

Ipomoea Painteri

Related to *I. costellata* Torr., but erect, 10-20 cm. high, annual, sparingly branched, hirsute above with spreading hairs: leaf blades pedately divided into 7-9 linear segments, these 5-15 mm. long, apiculate; petioles shorter than the middle segment: peduncles exceeding the subtending petioles, only rarely the blades, 1.5-2 cm. long, 1-flowered, bracts minute; pedicel portion slightly thickened, about 1 cm. long: sepals unequal, lanceolate or broader, acute, the outer ones shorter, 5 mm. long, the inner 6-8 mm. long, glabrous, the outer sepals slightly muricate-keeled and hirsute with a few scattered hairs: corolla cream-colored, funnelform, 10-14 mm. long; the 5-angled limb nearly as broad, each plicae ending at the margin in two minute, black spines: capsules globose, glabrous, 2-celled, 4-seeded.

Mexico: near Guadalupe, Federal District, Rose and Painter (no. 6825), September 6, 1903. Type, sheet no. 450386 in the herbarium of the U. S. National Museum.

Ipomoea Urbinei

Slender, twining, herbaceous (but probably from a perennial, tuberous root): stem glabrous, 50-150 cm. long: leaf blades narrowly ovate, cordate or cordate-sagittate, entire, acuminate, 3-4 cm. long, 2-2.5 cm. broad at the base, minutely pubescent above, glaucous and more densely but minutely pubescent beneath: peduncles exceeding the subtending petioles but not the blades, slightly confluent with the petiole below, 1-2-flowered: pedicels 6-9 mm. long, glabrous or nearly so: sepals unequal, glabrous, the inner oblong-ovate, acute, 8-10 mm. long, the outer

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ones much shorter, ovate, obtuse: corolla scarlet, slender, almost tubular and somewhat bent, 5-6 cm. long, the limb with five small acute lobes, scarcely spreading, about 1.5 cm. broad.

Mexico: "Faldas del Volcan de Colima," Barcena (no. 214), 1881. Type in the herbarium of Manuel Urbina, Museo Nacional Mexicana.

The type sheet bears the identification "*I. Llaveana* Meissn." to which it bears no close resemblance or relationship, being instead, related to *I. dubia*, *simulans* and *emetica*.

Ipomoea concinna

Slender, herbaceous, twining: stems puberulent above, the internodes elongated: leaf blades ovate, acuminate and mucronulate, the base sagittate-cordate, entire, 1.5-5 cm. long, 1-3 cm. broad, somewhat clasping the stem; petioles very short, 2-5 mm. long: peduncles usually exceeding the subtending leaves, 3-5 cm. long, filiform, 3-7-flowered: bracts minute, less than 1 mm. long: pedicels 6-10 mm. long: sepals equal or nearly so, oblong-ovate, the outer ones acute, scarious margined, more or less keeled, often with some slight pubescence, the inner ones obtuse, glabrous: corolla about 2 cm. long, funnelform, the white tube expanding into a 5-lobed, blue limb:

Mexico: "Valle de Ahualuco, E. de Jalisco," Barcena (no. 553), September, 1887. Type in the herbarium of Manuel Urbina, Museo Nacional Mexicana.

Ipomoea callida

Twining, stout, perennial, at least below: stems puberulent above, otherwise glabrous: leaf blades triangular in outline, 6-12 cm. long, 4-6 cm. broad at the base, strongly sagittate, acuminate, thick textured, glabrous, the basal lobes acute or obtuse, somewhat spreading, the sinus open and rounded: petioles shorter than the blades: peduncles exceeding the subtending petioles, 5-10 cm. long, 5-10-flowered in a rather close cyme: bracts minute or wanting: pedicels jointed, the ultimate segments about 1 cm. long: sepals very unequal, the inner longer,

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a. Ipomoea splendor-sylvae. b. Ipomoea Urbinei. c. Ipomoea concinna. d. Ipomoea eximia. (All figures slightly less than natural size.)

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1 cm. long, oblong or elliptical and rounded at the ends, the outer sepals suborbicular, about 5 mm. long: corolla funnelform, purple, 4.5-5 cm. long.

Honduras: Yuro road near Puerto Sierra, Percy Wilson (no. 534), 1903. Type in the herbarium of the New York Botanical Garden.

Ipomoea splendor-sylvae

Perennial, slender, high twining, glabrous: leaf blades ovate, deeply cordate, acuminate, the basal lobes rounded, sinuate-dentate on the outer margin with a few prominent teeth, entire toward the apex, 5-9 cm. long; petioles about equaling the blades or shorter: peduncles exceeding the subtending petioles and blades, slender, 10-18 cm. long, 1-3-flowered: pedicels 10-15 mm. long: sepals unequal, membranaceous, the inner longer, oblong or elliptical-oblong, 8-10 mm. long, obtuse or rounded: corolla 5-9 cm. long, scarlet, the tube slender within the calyx, expanding above the calyx into a tube 1 cm thick, the limb subentire, about 4 cm. broad.

Honduras: Highland creek above Bradley's plantation, Puerto Sierra, Percy Wilson (no. 286), 1903. Type in the herbarium of the New York Botanical Garden.

This species must be a conspicuous and beautiful plant in its native forests, possessing as it does bright green leaves of peculiar outline, and scarlet flowers on elongated peduncles. Few other known species possess toothed leaf blades.

Ipomoea Roseana

Nearest related to *I. tiliacea* (Willd.) Choisy (*I. fastigiata* Sweet), from which it is distinguished by its shorter peduncles and inflorescence, smaller sepals and corolla of different shape and color.

Perennial, slender, twining, 1- several m. long, glabrous: leaf blades ovate, deeply cordate with a narrow sinus, acute or acuminate, entire or slightly 3-lobed, 4-10 cm. long: petioles as long as the blades or shorter: peduncles shorter than the sub-

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tending petioles, umbellately 2-5-flowered: pedicels 6-10 mm. long: sepals unequal, thin, membranaceous, lanceolate, 6-8 mm. long, acuminately or cuspidately pointed: corolla campanulate-funnelform, pink or rose-colored, 3-3.5 cm. long, the limb as broad.

Mexico: Manzanillo, Colima, Palmer (no. 978), 1890. Type, sheet no. 208714 in the herbarium of the U. S. National Museum.

Described without name by Dr. J. N. Rose (Cont. U. S. Nat. Herb. **1**: 344. 1895).

Ipomoea Wilsoni

Related to *I. tiliacea* (Willd.) Choisy, but distinct from it by the rounded or obtuse sepals, the more slender corolla with relatively narrower limb and more deeply cordate, entire leaf blades.

Perennial, trailing or climbing, 1- several m. long, glabrous: leaf blades ovate, deeply cordate, acute or acuminate, entire, firm textured, 6-15 cm. long, the basal auricles rounded or slightly angled, veins prominent beneath, mostly paired; petioles shorter than the blades: peduncles about equaling the subtending petioles, stout, branching, cymosely many flowered, the ultimate pedicel portions 10-15 mm. long: sepals unequal, the margins slightly scarious, the inner ones longer and broader, oblong, 8-10 mm. long, obtuse or rounded at the apex, the outer sepals smaller, more nearly orbicular, rarely acute: corolla slender funnelform, purple, 5.5-6 cm. long, the limb subentire, about 4 cm. broad.

Honduras: Road to Rio Platano, Puerto Sierra, Percy Wilson (no. 530), 1903. Type in the herbarium of the New York Botanical Garden.

Ipomoea eximia

Perennial: stems herbaceous above, twining and branching, 50-100 cm. long or more, glabrous or with a few scattered hairs: leaf blades small, deltoid-reniform to triangular-ovate, 2-2.5 cm.

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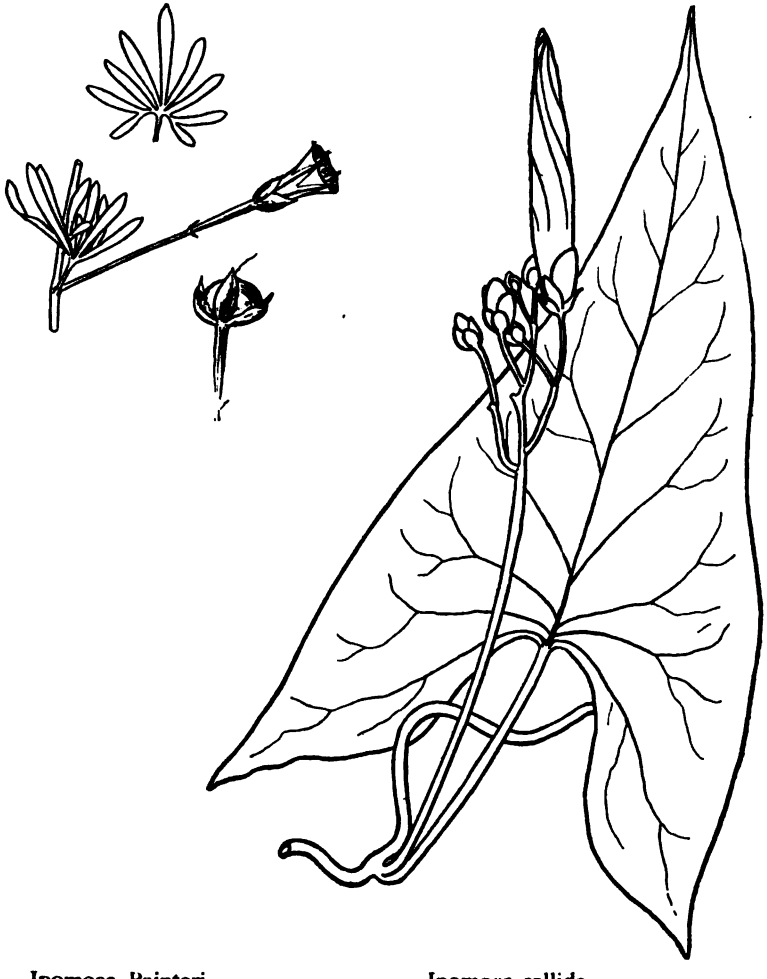

Ipomoea Painteri. Ipomoea callida.
(All figures slightly less than natural size.)

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broad, cordate, the apex obtuse, margins angled but scarcely lobed, sparingly hirsute on both surfaces, more so on the margins and veins beneath; petioles as long as the blades or shorter, finely pubescent, 15-20 mm. long: peduncles exceeding the subtending petioles but rarely the blades, 1-3-flowered, thickened below the calyx: sepals unequal, oblong-lanceolate, blunt, 5-8 mm. long: corolla funnelform, rose-purple, 4-5 cm. long, the rather abruptly expanding limb subentire, 3.5-4 cm. broad: the outer sepals and the pedicels slightly verruculose.

Mexico: Orizaba, Mueller (without number), 1855. Type in the herbarium of the New York Botanical Garden.

There are some strong points of similarity between this species and the description of *I. suffulta* (H. B. K.) G. Don, but that according to its description has acute or acuminate leaves which appear to clasp the base of the flower, while the corolla is described as being considerably larger.

Ipomoea vulsa

Perennial below, twining or trailing: leaf blades variously 3-5 lobed, in the mature blades the middle lobe much the largest, oblong or obovate-lanceolate, acute, 1.5-4 cm. long, lateral lobes smaller, obtuse, base of the blade cordate by the spreading basal lobes; smaller leaves with blades 3 lobed, lobes rounded or some blades with rather narrow lobes; petioles longer than the blades: peduncles exceeding the subtending petioles, 3-5 cm. long, 1-2-flowered: sepals unequal, the outer ones obovate, about 6 mm. long, the inner ones broadly oblong, 8-10 mm. long, rounded, erose and ciliate: corolla blue or purplish, 3-4 cm. long, the limb campanulate-funnelform, 3-4.5 cm. broad.

Mexico: Orizaba, Mueller (without number), 1855. Type, sheet no. 291646 in the herbarium of the U. S. National Museum. Sheet no. 291644, seems to be of the same collection, and is identical with the other sheet.

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Ipomoea signata

Perennial below, twining, stout, densely hirsute pubescent, especially the younger parts: stems shaggy and retrorsely hirsute above, less so below, 1- several m. long: leaf blades ovate, cordate, acute, 4-6 cm. long, 3-5 cm. broad, green and sparingly pubescent above, strongly hirsute pubescent beneath; petioles shorter than the blades, hirsute: peduncles exceeding the subtending leaves, 8-12 cm. long, sparingly pubescent above, 1-3-flowered: pedicels 20-25 mm. long, somewhat thickened, glabrous: sepals subequal or the outer somewhat shorter, ovate, coriaceous, acute, 9-10 mm. long: bracts minute or wanting: corolla scarlet, slender funnelform, 6-7 cm. long, the limb 3.5-4 cm. broad: the style and stamens as long as the corolla but not exserted.

Guatemala: Between Jacaltenango and San Martin, E. W. Nelson (no. 3595), December 24, 1895, altitude 5300-7000 feet. Type, sheet no. 252762 in the herbarium of the U. S. National Museum.

The sheet bears the determination "*I. serotina* R. & S.," but that is according to Choisy a species of *Quamoclit* (*Q. mutica*), and the original description of *I. serotina* describes the pedicels as shorter than the leaves, which is not the case in the species here described.

Clemson College, South Carolina.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—II

By A. A. Heller

Unless a statement is made to the contrary, all the species mentioned in this paper may be found on the ridges west of Los Gatos, where they have been observed and collected by myself.

FEBRUARY

TRILLIUM GIGANTEUM (H. & A.) Heller

This is one of the species found in bloom early in the month. With us the flower is invariably dark, usually maroon or brownish, commonly two or three inches long, standing erect above the three broad, green or mottled leaves. The flower segments vary in width and shape, some of them quite narrow, only about a quarter of an inch wide, while others are two or three times as wide, narrowed toward the apex. In one form or another the species is found in the hills in the coast region from Santa Clara county to Oregon. The type was collected near San Francisco. In some localities the flowers are white, while "the var. chloropetalum Torr., with greenish petals, is common on the peninsula of Pt. Reyes in Marin Co.," according to Jepson. Whether any one has actually seen greenish flowers in the living state I do not know, but dried specimens in my herbarium now show greenish flowers which were originally white. Observation in the field has taught me that we have but a single variable species. In Sonoma county I frequently found both maroon and white flowered forms, forms in which the flowers had either broad or narrow segments, and forms with either mottled or unmottled leaves, all growing in the same patch. Botanists who see only herbarium specimens might easily conclude that we have several species instead of one. It grows on damp hillsides, especially on northerly slopes, usually about thickets, along fences, or in ravines. It is a member of the family Trilliaceae, well represented on the Atlantic side of this country.

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MONTIA PERFOLIATA (Donn) Howell. *Indian lettuce. Miner's lettuce.*

This also is one of the early bloomers, and is found everywhere, especially in orchards. The plants we understand make very good "greens," although we have never tried them. There are a multitude of forms, the plants which grow in rich ground often being a foot or more in height with leaves two inches or more in diameter, while plants growing in poor soil may be only a few inches high. Some plants are upright, while others are low and spreading. Some have narrow linear basal leaves, while on others these leaves have a broad, variously shaped blade. The pair of leaves on the stem is always united, appearing like a single large round one. Above this connate-perfoliate leaf is the raceme of small white or pinkish flowers, the lowest flower sometimes sitting closely against it, but always subtended by a small bract. The plants grouped under this name should be carefully studied in the field. They range over the whole Pacific slope, and eastward into the Rocky mountain region. From a hasty examination of a few plants, I seem to find that those with narrow leaves have small white flowers, while those with broad leaf blades have larger pink tinged flowers.

MONTIA SPATHULATA (Dougl.) Howell

This is a very small plant, as a rule only an inch or two high, and grows in gravelly places or on rocks on hillsides, less often in cultivated ground; but I find it in orchards near our place. The plant is glaucous and fleshy, clings closely to the ground, and is therefore easily overlooked. The small flowers are like those of *M. perfoliata*, but the stem leaves are quite different. They are narrow, acute, dilated at base and joined only on one side, equaling or exceeding the short raceme. The species has a range nearly as great as that of *M. perfoliata*.

CALANDRINIA ELEGANS Spach. *Red maids.*

A handsome species with deep rose purple flowers a half inch across. It is common in orchards, vineyards and other

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cultivated ground, the plants fleshy, the larger ones growing in mat like masses a foot or more in diameter. The flowers, which are open only on bright sunshiny days, show at once that it is a member of the Portulaca family. It is more commonly called *C. Menziesii* or *C. caulescens* var. *Menziesii*, but that has a small flower little exceeding the calyx.

RIBES OCCIDENTALE H. & A. *Gooseberry.*

This is the common gooseberry in our vicinity, but found only at medium elevations, hardly ascending above 1000 feet. It is plentiful about thickets among the low hills bordering the valley, and even abundant in Los Gatos south of East Main street, where it occurs as a dense rounded shrub five or six feet high. The flowers are greenish white, and usually very abundant, hanging from the under side of the branches. The berries, which ripen in June or earlier, are a quarter of an inch in diameter, wine red, sparingly armed with red spines. This species is common in the Bay region, extending from Santa Clara north to at least Sonoma county. The two cleft style is one character which distinguishes it, although no other species resembles it unless perhaps *R. Californicum*. Strangely enough, it was at one time considered identical with *R. Menziesii*, a species with large red flowers, found only in the coast region in Mendocino and Humboldt counties, and perhaps extending northward into Oregon.

OSMARONIA DEMISSA Greene. *Oso berry.*

That this neat little shrub belongs to the cherry family is easily seen. It is two to four feet high, sparingly branched, the slender stems upright and rather rigid. The oblong leaves are two inches long or less, deep green above, glaucous beneath. The few flowered racemes droop from the ends of the branches, the flowers white, about a quarter of an inch in diameter. The above name, published by Greene in Pittonia, 5: 310. 1905, is apparently the proper one for our plant, not *O. cerasiformis*, a species of northern California and Oregon. It is rather common

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about thickets, along overgrown fence rows, and at other favorable places in the hills, preferring moist northerly slopes. The fruit is "blue with a dense bloom," somewhat like a small olive in appearance. Its range is said to be "the hills encircling San Francisco Bay."

ARCTOSTAPHYLOS ANDERSONII Gray. *Manzanita.*

A shrub doubtfully referred to this species is common on the ridges west of Los Gatos. The leaf is variable, on some plants being almost orbicular, but is commonly longer than broad, an inch wide, and about an inch and a half in length. The young branches and petioles are clothed with spreading chaffy hairs. The small white flowers are a quarter of an inch long, about a fifth of an inch broad at base, tapering suddenly and constricted just below the apex to less than an eighth of an inch, the short rounded lobes of the petals slightly downcurved. The leaves are blue-green in color. The type was collected near Santa Cruz among the redwoods. It is said to occur on the Oakland Hills and on Mt. Diablo, but is not known from north of San Francisco. So far as I know the form here mentioned is restricted to the ridges west of the town, the one found on the east side being some other species.

DODECATHEON CRUCIATUM Greene. *Mosquito bills. Sailor's caps. Shooting star. Meadia.*

Those who are familiar with the Cyclamen will have no trouble recognizing this plant, for the flowers of the two resemble each other. The rose-purple petals instead of spreading or standing erect as do most petals, are turned back and upside down as it were, the exposed and closely pressed together stamens pointing downward. The corolla tube is very short, only about a tenth of an inch long, but twice as broad, its face or the part around the stamens of a rich purplish brown. At the very bottom of the tube is a narrow band of yellow, then a narrow band of white shading into the rose-purple of the limb. The whole flower, including the stamens, is from three-fourths to an

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inch in length, the oblong petals commonly about a quarter of an inch wide, but sometimes either narrower or wider. The leaves are fleshy, two to three inches long, obovate, the blade an inch wide or less and about as long, tapering into a broad petiole nearly twice the length of the blade. The upper side is rather bright green, the under side paler. They lie close to the ground. The plant is a denizen of open grassy places on hills, nowhere very abundant, but a few plants occurring here and there. The flower of this species has only four petals.

CYNOGLOSSUM GRANDE Dougl. *Hound's tongue.*

Douglas first collected this handsome plant in "shady woods, N. W. Coast," or somewhere in western Oregon or Washington. Thence it extends southward in the coast region to Monterey. It is commonly about two feet high, several plants often growing together in a clump. The large leaves are mostly from near the bottom of the plant, ovate, as much as seven or eight inches long, five inches or less wide, on long petioles. The flowers are several on long, ascending stalks, pinkish in the bud, pale violet blue and nearly a half inch in diameter when fully expanded, the lobes spreading. At the top of the corolla tube, completely closing it and concealing the five yellow anthers, are five stout white appendages which are very conspicuous. The plants are not as a rule plentiful in any given locality, but are found scattered here and there in open woods, about thickets, or less rarely on grassy hillsides, in rich soil.

PEDICULARIS DENSIFLORA Benth. *Indian warrior. Lousewort.*

A foot high or less, the rather stout erect stems unbranched and often reddish, as are the lanceolate leaves, which are divided into numerous segments, and these again cut and toothed. The whole upper part of the plant is dull crimson, the upper or floral leaves being colored like the flowers. The flowers are about an inch long and of rather peculiar appearance. They are quite flat, the upper lip showing only a narrow slit on the face, the apex rounded and closed over the stamens and pistil which are

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completely hidden. The lower lip is situated at about the middle of the corolla, and is composed of three short, rounded teeth, the middle one twice the length of the lateral ones and only half as wide, somewhat spoon-shaped. An inhabitant of clayey banks in and about thickets or in open woods. While it may be fairly plentiful at any given place, the localities are scattered. It occurs above our place, and I have heard of another station near Saratoga. To my personal knowledge it is found as far north as Sonoma county.

RIBES SUKSDORFII.—In a recent letter from Mr. Suksdorf he confirms my supposition concerning the place where the type was collected. He writes as follows: "The specimens you received from me were collected right here at Bingen, on the 17th of April, 1897. It may be well to state here that I am at the same place where I have collected for so many years, our post office being first at White Salmon. Later the people took the post office away from the river, a few miles further back and higher up on the bluff. Then the post office of Bingen was established here, twelve years ago or more. In a specimen collected in fruit in 1883, there are two spines at one place and three at another, and a few spines are longer than usual. I have a few 4-flowered racemes, and in one specimen they are mostly 2-flowered. However, these things all seem to be exceptions, yet they show that some variation is to be expected in both species. I have noticed many times that there is some variation in the color and size of the calyx. I hope it may prove to be very distinct from *R. divaricatum*, of which I have only two small fragments, collected below Vancouver, not enough to be of much value for comparison, but the flowers and leaves are different."

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COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

In Bull. Acad. Cracovie, January, 1906, Dr. Edward Janczewski, of Krakau, Austria-Hungary, published two new species of *Ribes* from California, described as follows, the originals in Latin:

Ribes Santa Luciae Jancz. l. c. 9 [reprint]. "Shrub probably stout: young branches puberulent; leaves 3-5-lobed, cordate at base, puberulent beneath; racemes medium sized (6 cm.) 20-flowered; bracts elliptical, red, bractlets nearly obsolete; flowers pedicelled, pubescent, hypocrateriform? red? receptacle tubular, sepals a little longer than the receptacle, petals subspatulate, stamens equaling the petals, anthers roundish, foveola nectariali munitis, style bifid at the apex, the anthers barely surpassing it, ovary puberulent and glandular; berry with scattered stipitate glands.—Western North America: California (Santa Lucia mountains).—Fowers in anthesis and mature fruit unknown, on account of which our description is imperfect.—(Barber, June 16, 1899, in our herbarium).

"A species closely related to *R. sanguineum* and *R. glutinosum*, but easily distinguished by the nectar bearing anthers."

Ribes Hallii Jancz. l. c. "Shrub, probably small: branchlets hornotinis pubescent and glandular-setulose; leaves roundish or subreniform, sublobed, the lobes short, obtuse, the base cordate, subpubescent and glandular; racemes corymbose, 5 cm. long, few flowered (4-8), bracts conspicuous, green, lanceolate, pedicels elongated; flowers large, campanulate, pubescent, greenish, the margins reddish, glandless, receptacle subcampanulate, sepals subacute, petals white, somewhat shell-shaped, broad, sta-

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mens equaling the petals, anthers white, ovoid, foveola nectariali munitis, style lobed at the apex, longer than the stamens, glabrous, ovary pyriform, very smooth; fruit unknown.—Western North America: northern California (Sierra Nevada and Siskiyou mountains), altitude 2200-2500 m.—(Hall & Babcock, no. 4370, 5533, in our herbarium).

"Plant similar to *R. viscosissimum*, but well distinguished by the color of the flower and the glabrous ovary. Is it a distinct species?"

NOTE ON A TRADESCANTIA.—*Tradescantia universitatis.* Tall, up to about 4 dm., robust, the stems 7 to 8 mm. in diameter toward the base: entirely smooth, except that the sepals have on the middle of the outer face a number of erect gland-hairs in specimens growing in drier ground, but in specimens from damp ground these are almost or quite absent: the pedicels may have a few gland-hairs, but never enough to attract notice: pale glaucous green, the leaves large and broad, the lower ones up to about 3.5 dm. long, 14 mm. broad at base, the basal 22mm. forming a closed sheath: flowers up to about 35 mm. across, deep brilliant purple, the anthers bright yellow or orange: sepals about 14 mm. long, with no sign of a hairy apical tuft. Boulder, Colorado, June 2, 1906. Type locality the campus of the University of Colorado. In the table of *Tradescantia* given by Bush this comes in as follows:

Stems tall, robust, little branched	
Sepals glabrous, with a tuft of villous hairs at apex (east of the plains)	*reflexa*
Sepals variably glandular-pilose, with no tuft of villous hairs (west of the plains)	*universitatis*
Stems slender, much branched	
Sepals smooth (New Mexico)	*scopulorum*

It may be that all three are geographical races of one species, but intermediates do not seem to have been collected. The species *T. universitatis* was first indicated in Nature, page 7, November 1, 1906.—T. D. A. COCKERELL.

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EDITORIAL

We are now regularly running twenty pages each month, the number originally planned. The trouble will not be to find enough material each month, but to find an excuse for not printing more. The time when we shall enlarge to twenty-four, twenty-eight, or thirty-two pages rests not with the editor, but with the botanical public and the present subscribers. As matters stand at present, the subscription list is too small for the size of the journal. We are doing this work for the benefit of botanical science, and want our subscribers to take a personal interest in the success of the venture. Do not feel that your part is done when you have sent in your own subscription, but let us have the names of friends whom you think might be interested, or tell them about it yourself. Also, do not wait for some one else to write articles about things which you would like to see in print, but write them yourself. Other people are sure to be interested.

One thing we wish you to keep green in your memory is that the editor is not going to dictate to you as to how certain things are to be printed, or refuse to put them in unless you conform to his way of thinking. He confesses to a preference for capital letters when species bear personal or geographical names, but when a contributor sends in names beginning with a small letter they are printed that way. Such a course interferes somewhat with "style," but we consider that a small matter. Similarly in regard to nomenclature the author of a paper should be responsible for the names, not the editor. Personally we are addicted to what has been termed the "new" nomenclature. To our mind it is, if priority is rigidly inforced without regard to exceptions, double names, or anything else which tends to break down priority, the only honest kind of nomenclature, but we do not feel in the least aggrieved if other people think differently, and are willing to let them use any kind of name they prefer, under their own signature.

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In the series of papers on *Ribes* by Janczewski in Bull. Acad. Cracovie, two descriptions from which are included in this issue, we find several things to which we take exception.

He enlarges the section, or rather genus *Robsonia* of Berlandier, to include such species as *R. Lobbii*, *Menziesii*, and least expected of all, *occidentale*. *Robsonia* was founded upon *Ribes speciosum*, an evergreen species with 4-merous flowers, the calyx lobes erect, not reflexed in anthesis, and it has no relative near enough to be joined with it in a section. It is true, six of his seven species have, like *speciosum*, large flowers, but we can see no other reason for including them.

Under *R. Menziesii* he includes *subvestitum*, *Victoris*, and *amarum* as synonyms. In general appearance *subvestitum* is something like *Menziesii*, but in addition to different floral characters, it has yellow fruit covered with glandular yellow bristles, instead of being red. *Victoris* also has yellow fruit, its flowers quite different from those of *subvestitum*. *R. amarum* from the southern part of California is certainly distinct enough. True *Menziesii* is rare in herbaria, and we have only recently definitely placed certain specimens as being of this species. The type was collected at Trinidad in Humboldt county, California, and we doubt whether the species may be found south of the adjoining county of Mendocino, and that only in the coast region.

R. hesperium is said to be a synonym of *occidentale*. This is simply astonishing, since the two do not in the least resemble each other. *R. occidentale* is our commonest species here at Los Gatos. Had he confused *amarum* and *hesperium*, both from the same region in southern California, and resembling each other superficially, there would be little ground for dissent.

There are still other examples which might be cited, but the above are sufficient to show that Dr. Janczewski has evidently not profited by the studies of workers in the field, who have in recent years written upon the subject from intimate first knowledge of the plants in both the living and dried state.

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Volume 3 June, 1907 Number 4

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A monthly journal of botany devoted to flowering plants and ferns. Price $1.00 a year, beginning with volume 3.

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A. A. Heller, Editor
Box 58, Los Gatos, California.

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Volume 3 No. 4

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, JUNE 8, 1907

RECENT ADDITIONS TO THE FLORA OF SOUTHERN CALIFORNIA

BY S. B. PARISH

BOTRYCHIUM SIMPLEX E. Hitchc. Am. Journ. Sci. **6**: 103. 1823.

A single specimen of this fernwort was collected in July, 1906, by Ross Robertson, in Mill Creek canyon, San Bernardino mountains, at about 1600 m. altitude.

NEPHRODIUM PATENS Desv.

This fern has been included in the California flora on scanty collections made near Santa Barbara. It has now been found in Eaton canyon, near Los Angeles, by Ernest Braunton.

PANICUM CRUS-GALLI L. var. HISPIDUM (Muhl.) Torr. Fl. N. Y. **2**: 424. 1843.

San Bernardino, well established in low grounds.

PANICUM LINEARE Krok. Fl. Sil. **1**: 95. 1787.

Pasadena, George B. Grant, "recently introduced."

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PANICUM SCRIBNERIANUM Nash, Bull. Torr. Club, **22**: 421. 1895.

West fork of San Gabriel river, in a cienega, July, 1906, Dr. H. E. Hasse. The *P. scoparium* Lam., reported in Abrams' Flora of Los Angeles, p. 23, from San Jacinto mountains, and from Glenn Ranch in the Cucamonga mountains, is more probably this species.

BROMUS ARENARIUS Labill, Pl. Nov. Holl. **1**: 23. *pl. 28.*

A few clumps of this Australian grass were found growing along the Arrowhead road, at about 1000 m. altitude, in the San Bernardino mountains, June 14, 1905, by Fred M. Reed and the writer. Perhaps little more than a casual, but in view of the facility and rapidity with which the introduced bromes have spread in southern California, it may be expected to establish itself. A foreign grass would hardly be expected to make its first appearance in America by the side of an obscure mountain road. It seems, therefore, not improbable that the present is a secondary introduction, and that the plant has obtained a primary foothold in some place where commerce might more easily scatter the seed, but where it has not yet happened to have met the eye of a botanist. Identified by Professor Hitchcock.

FESTUCA CONFUSA Piper, Cont. U. S. Nat. Herb. **10**: 13. 1906.

Las Flores Ranch, at the exit of the Mojave river from the San Bernardino mountains, May, 1906, C. F. Saunders.

FESTUCA ERIOLEPIS Desv. in Gay, Fl. Chil. **6**: 428. 1853.

Common on the southern slopes of the San Bernardino mountains, at about 3000 feet altitude, 5730 and 5753 Parish, May and June, 1906.

JUNCUS PARRYI Engelm. Trans. St. Louis Acad. **2**: 147. 1866.

Near the summit of Grayback mountain, 3500 m. altitude, in 1904, Mrs. C. M. Wilder.

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ERIOGONUM FASCICULATUM Benth. var. **polifolium** (Benth.)

E. polifolium Benth. in DC. Prodr. **14**: 12. 1856.

In the desert region this is the prevalent, perhaps the exclusive, form, the species being confined, apparently, to the cismontane region. But this, also, is by no means uncommon in the latter region, especially in the interior, as are abundant intermediates, which connect it too closely with the species.

ERIOGONUM FASCICULATUM Benth. var. **maritimum** var. nov.

Stems slender and less woody than in the species, growing in compact, depressed clumps, 25-30 cm. high, and of greater breadth: flowers as in the species. A well marked habital variety, in manner of growth very different from the species or the preceding variety.

Prevalent near the seacoast of San Diego county. No. 4445 Parish, collected in June, 1897, at Oceanside, may be taken as the type.

CHENOPODIUM ANTHELMINTICUM L. Sp. Pl. 220. 1753.

C. ambrosioides L. is a common weed throughout the cismontane region of southern California, but the present closely allied species has not been reported. Mr. F. M. Reed now finds it established in orange orchards at Riverside, where, he thinks, it was introduced in stable manure brought from the north.

CHENOPODIUM CARINATUM R. Br.

Pasadena, Geo. B. Grant, 1906; "a recent introduction." This weed has probably reached us from the central part of the State, in some parts of which it appears to be common.

CAKILE EDENTULA (Bigel.) Hook. Fl. Bor. Am. **1**: 59. 1830.

Collected in 1905, in the vicinity of Los Angeles, by Ernest Braunton. [Undoubtedly our *C. Californica*, described on page 10 of this volume.—ED.]

LESQUERELLA GRACILIS (Hook.) Wats. Proc. Am. Acad. **23**: 253. 1888.

Canyon Spring, Colorado desert, April, 1905, 5845 H. M. Hall.

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LITHOPHRAGMA SCABRELLA Greene, Erythea, 3: 102. 1895.

In dense shade, on the banks of Deep Creek, 1800 m. altitude, in the San Bernardino mountains, June 15, 1905, 5821 Parish. Identified by Dr. Small.

GERANIUM PYRENAICUM L.

Collected in 1905, by the Rev. George Robertson, near Camp Vivian, 2100 m. altitude, San Bernardino mountains. Identified by Dr. B. L. Robinson. This species is reported in the Synoptical Flora as having been collected at Bethlehem, Pa.; it is otherwise unknown in America. Mr. Robertson's collection was made on a seldom traveled trail leading to the summit of Grayback mountain, and far from any habitation, nor were there any circumstances connected with it suggestive of an adventicious origin. Yet in view of its European distribution it is difficult to consider it a native of these mountains. It is to be hoped that further collections may establish its true character.

EUPHORBIA MACULATA L. Sp. Pl. 455. 1753.

A recently introduced street weed at Pasadena, first collected in 1904, by George B. Grant.

SPHAEROSTIGMA BISTORTA Nutt. var. **Reedii** var. nov.

Strict or few branched, erect, 10-40 cm. tall, hirsute throughout: leaves mostly ovate, or sometimes narrower, denticulate, 2-5 cm. long: petals 6 mm. long, more or less saliently 1-toothed from the emarginate apex.

Arrowhead road, San Bernardino mountains, at about 1000 m. altitude, June 24, 1905, Fred M. Reed, and same time and place, 5794 Parish. In extreme specimens the long slender tooth which terminates the petals gives the flower a very distinct aspect, but others were found where the teeth were nearly obsolete.

OENOTHERA LACINIATA Hill, var. GRANDIS Britton, Ill. Fl. 2: 487. 1897.

O. laciniata Hill, var. *occidentalis* Small, Bull. Torr. Club, 23: 173. 1896.

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O. sinuata L. var. *grandis* Britton, Mem. Torr. Club, **5**: 358. 1894.

O. sinuata L. var. *grandiflora* Wats. Proc. Am. Acad. **8**: 381. 1873. Not *O. grandiflora* Ait. 1789.

Collected at Mentone, at the head of the San Bernardino valley, June, 1906, by the Rev. George Robertson. Here probably belongs my 2964, collected in fruit only, June, 1904, in Pipe canyon, at the eastern desert base of San Bernardino mountain.

OENOTHERA LACINIATA Hill, var. MEXICANA (Spach) Small, Bull. Torr. Club, **23**: 173. 1896.

O. sinuata L. var. *hirsuta* T. & G. Fl. N. A. **1**: 494. 1840.

Collected with the foregoing variety, and occurring in greater abundance, at Mentone, by the Rev. George Robertson.

LAPPULA MYOSOTIS Moench, Meth. 417. 1794.

Echinospermum Lappula Lehm. Asperif. 121. 1818.

Santa Monica, Dr. H. E. Hasse, in 1906. Perhaps merely a casual, but likely to become established.

SOLANUM NIGRUM L. Sp. Pl. 186. 1753.

This widely introduced plant has not been reported from southern California, or with certainty from the State. It was collected in 1906, at Riverside, by Fred M. Reed.

VERBASCUM THAPSUS L. Sp. Pl. 177. 1753.

Well established in cultivated fields, on the south side of the Santa Ana river, above Colton, where it has escaped from plants cultivated for their reputed medicinal value.

ORTHOCARPUS ERIANTHUS Benth. Scroph. Ind. 12. 1835.

San Fernando, Los Angeles county, Mrs. C. M. Wilder.

ERIGERON LINIFOLIUS Willd. Sp. Pl. **3**: 1955. 1798.

While it is only within the past year that this plant has been observed in our region, it now comes from so many sources that it evidently must have been established for a considerable

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period. We have it from Redlands, Louis A. Greata; Pasadena, George B. Grant; Riverside, Fred M. Reed; Old San Bernardino, Parish.

SENECIO SERRA Hook. var. INTEGRIUSCULUS Gray, Syn. Fl. **1**: Part 2, 382. 1884.

Dry Lake, 2700 m. altitude, San Bernardino mountains, September, 1905, Mrs. C. M. Wilder.

VERBESINA DISSECTA Gray, Proc. Am. Acad. **20**: 299: 1885.

Three years ago, in the Bulletin of the Southern California Academy of Sciences, **3**: 83, I had occasion to mention the occurrence of this plant on the sea coast, near Arch Beach. It had been known previously only from Lower California. It has now been collected by the Rev. George Robertson at Dobb's Camp, 3000 m. altitude, Grayback mountain, the highest peak of the San Bernardino range. This is well up in the Transition zone. So great an altitudinal range is almost unprecedented in our flora, being shared, so far as I recall, only by *Argemone platyceras*, a plant which is found in every phytogeographic zone and subzone below the Canadian. Identified by Dr. B. L. Robinson.

San Bernardino, California.

Upon examining a recent collection of what seems to be *Pentstemon heterophyllus*, I find that of the four perfect stamens the two short ones are inserted at the very base of the corolla tube and free from it. The two long ones are adnate to the tube for its whole length on the lower side, the free portion of the filaments following the curve of the corolla, and close to it. The sterile stamen or staminodium is also affixed to the tube, but on the upper side, the free portion curving at the base, then erect, thus standing inward, away from the corolla. These characters may be generic, but I find no mention of any of them in our books.—A. A. HELLER.

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FLORA OF COLORADO

By P. A. Rydberg, Ph. D., published by the Agricultural Experiment Station, Fort Collins, Colorado.

This is a work which marks an important period in the study of the Rocky mountain flora. While it is not a manual, it contains a full list of genera and species, with keys to them, and also a key to the orders. The localities in which the plants have been collected are given under each species, which in many instances will serve to identify specimens. A map of Colorado a gazetteer and a good index are appended. It is much to be regretted that some characterization of species could not be made, but the work now comprises over four hundred pages, and as stated in the introduction, Dr. Rydberg did not have the time to prepare descriptions nor the Agricultural College available funds to meet the expense. Most of the work was done by Dr. Rydberg, but he had the assistance of several specialists in some of the genera, notably of Dr. Theodor Holm, who characterized the groups and species of Carex.

No other work on the plants of Colorado has been so carefully and thoroughly done as this one, both as regards the number of species and in assigning names according to priority of publication. At the present time it comes as near being a final authority on the botany of the region for which it was made as knowledge will permit. It presents a great contrast to all the books on the botany of Colorado which have preceded it. The first flora of Colorado was published by the Department of the Interior of the United States in 1874, its authors Dr. Thomas C. Porter and John M. Coulter. It listed 1350 species of flowering plants and ferns, under 435 genera, comprised in 85 families. Do doubt the number of species was considerably increased when Coulter's Manual of Rocky Mountain Botany was published in 1885, but there is no way of telling from that work how many were added. During the next ten years quite a number of species were added by various students and collectors.

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Miss Alice Eastwood while a teacher in the East Denver high school became an enthusiastic botanist, did a great deal of collecting, and in a series of papers published in Zoe, added many species to the known flora of Colorado, some of them new to science, but most of them plants newly discovered in the State.

During this time the work was continued under the ideas regarding genera and species as represented by Dr. Asa Gray in the Synoptical Flora of North America. But during the past ten years the increase both in the number of genera and species has been very considerable because of the narrowed concept on the part of many of our botanists of what constitutes genus and species. Nearly all those plants which were once considered varieties have been given the rank of species, and I suppose that many which fifteen years ago would scarcely have ranked as varieties have been given that rank. In the characterizing of new species Dr. E. L. Greene has led the way, and a large majority of the new plants of the Flora of Colorado are of his publishing, with many more by Dr. Rydberg and Professor Aven Nelson of the University of Wyoming. The result is that the new Flora lists 2912 species, under 702 genera, comprised in 134 families. This is enough to surprise the older students of Colorado botany, and Dr. Rydberg, aware of the attitude of many toward the radical changes of the past few years, says in the introduction that he "belongs to that radical school which believes in small genera with closely related species," and that "the division of genera as well as species has gone perhaps a little further than many would think advisable, but the author has tried to be consistent." To illustrate the great change in the number of genera and species, a few examples may be cited. *Euphorbia* disappears as a genus, and its place is taken by *Chamaesyce*, *Zygophyllidium*, *Dichrophyllum*, *Tithymalus*, and *Poinsettia*. *Astragalus* is divided into seventeen genera, and *Mentzelia* into three. *Aster ericaefolius* as in Coulter's Manual, becomes *Leucelene* with four species. Coulter's Manual has five species of *Mertensia* all told, while twenty-five are now credited

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to Colorado. *Castilleja* has grown from nine species to twenty-seven, *Eriogonum* from twenty-seven to fifty, and *Delphinium* from five to eighteen. *Aconitum Columbianum* has become five species. The number of species in *Aster*, *Erigeron* and *Solidago* are greatly increased, and so through the book with the larger genera.

Quite a number of this long list of additions are earlier described species which have been discovered in Colorado, and many species have been reinstated which were described long ago and later suppressed. For example, what was called *Ribes cereum* in Colorado becomes *Ribes pumilum* Nutt. and *Ribes inebrians* Lindl. The larger part of them however, are new species resulting from a re-study of herbarium material especially of the notable collections of the past few years. In the preface to the Flora, Professor Carpenter makes mention of the work in collecting of Professors Cassiday, Crandall and Cowen, all of whom collected especially for the Agricultural College. But the notable collections which make quite a considerable part of the citations of localities where the species have been found, were made by Baker, Tracy and Earle in southwestern Colorado in 1898; by Mr. C. F. Baker in southern Colorado in 1899; by Rydberg and Vreeland in southern Colorado in 1900, and by Mr. C. F. Baker in the "region of the Gunnison watershed" in 1901.

Some of the species, some of the chenopodiums, for example, are too common for collecting, and one looking over the Flora might think them rare in the State; and quite a number of rare plants, as *Ribes viscosissimum*, *Oreobroma Nevadensis*, *Erocallis triphylla* and *Cymopterus Parryi* have but a single record. Such instances show the debt of a flora to the collectors. *Lewisia redeviva* is noted from a single locality, though I suppose it is not extremely rare.

Notwithstanding the painstaking care to include all the species known to occur in the State, some have been overlooked, among which are *Solidago speciosa* Nutt., *Lacinaria spicata*

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(L.) Kuntze, *Pyrrocoma lanceolata* (Hook.) Greene, *Crepis gracilis* (D. C. Eaton) Rydb., *Lobelia cardinalis* L., *Hydrophyllum Virginicum* L., *Adenostegia ramosa* (Nutt.) Greene, *Ligusticum filicinum* Wats., *Gentiana calycosa* Griseb., *Thalesia uniflora* (L.) Britton, *Spiesia gracilis* A. Nelson, *Astragalus lotiflorus* Hook., *Saxifraga caespitosa* L., *Ribes Cynosbati* L., *Petrophyton caespitosum* (Nutt.) Rydb., *Hutchinsia procumbens* (L.) Desv., *Cardamine umbellata* Greene, *Thelypodium Nuttallii* Wats., *Arabis rugocarpa* Osterhout. It is quite likely that *Ligusticum affine* A. Nelson, should be changed to *Ligusticum simulans* C. & R.

Are all the newly made species good? Will they stand the test of time? It would not be surprising in so many publications to find some that will not. Field study has hardly kept pace with the describing of species, and careful field study is at all times needful, particularly so in Colorado where there are such differences of prairie and mountain, dryness of desert and moisture of stream bank. It is likely, however, that most of them will keep their places. Dr. Rydberg has found it necessary to reduce to synonymy a number of species, and in a few instances species have been reduced to varieties, and I think properly so. I think that students of plants would much prefer that species should be distinguished by evident characters; that they should be plants really separable from other like plants; and it may be that a species should not be established by a single character, unless a fruit character. *Cardamine infausta* Greene (*C. cardiophylla* Rydb.), for example, is separated from *C. cordifolia* Gray, solely because of pubescence on the stem. The plants are of the same size, the leaves the same shape, the flowers and fruit the same, and the plants grow together. At most the later named plant is only a variety of the older one.

Concerning the advisability of so many additional genera I can speak; but one can only regret so many changes, and hope that the nomenclature of our plants may soon become settled. Several years ago some of our leading botanists who were advo-

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cating changes assured us that the proposed changes would make names stable, but the promise has not been more than partially fulfilled. So many changes are confusing and discouraging to the student, and if other writers on Rocky mountain botany do not accept the changes made by Dr. Rydberg, the confusion will be increased.

This book should and will cause more careful observation in collecting and a re-study of herbarium material; and such study will result in many pleasant surprises to the student. All students of botany in Colorado and the Rocky mountain region will be debtors to Dr. Rydberg and to the Colorado Agricultural College for this Flora which brings together the work of so many students and collectors; and students too will welcome the forthcoming work of Dr. Rydberg on the botany of "the whole Rocky mountain region."—GEO. E. OSTERHOUT, *New Windsor, Colorado.*

During the summer of 1903 an extensive forest fire raged over the ridges to the south and southwest of Los Gatos, burning over many acres. In the spring of 1904 on immense patch of yellow became visible on the nearest ridge, and inquiry failed to elicit any information concerning the plant which produced it, since the plant had never been noticed before. Investigation showed that it was *Monolopia gracilens*, the type of which came from Almaden, several miles east of Los Gatos. A few plants were afterwards seen on a ridge on the south side of the canyon, and this year it was noticed sparingly along Steven's creek, about ten miles northwestward from Los Gatos. But the fact to which we wish to call attention is that the plant has not since appeared in the place where it was so plentiful three years ago, nor have other species been noticed which were abundant at the same place. Much of the area is now overgrown with scrub, and *Helianthemum scoparium*, a plant not much in evidence at first is equally as plentiful as was the *Monolopia*, but since the *Helianthemum* is perennial, it is likely to remain.—ED.

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A NEW MERTENSIA FROM COLORADO

By T. D. A. Cockerell

Mertensia secunderum

About 23 cm. high, hoary-strigose all over, including both sides of the dark green leaves, calyx, etc.: leaves sessile, the lower ones narrowly linear, the upper lanceolate or lanceolate-linear, about 68 mm. long and 11 or 12 mm. wide, the widest point not far from the clasping base, the apex tapering; the lower, narrow, leaves have the midrib very prominent, and feeble lateral nervures; the broader upper ones have the lateral nervures very distinct; no cross nervures: flowers numerous, the corolla about 12 mm. long, the bright blue limb nearly 7 mm., the stout tube nearly 6 mm.: calyx cleft much beyond the middle, the lobes lanceolate, acute, conspicuously shorter than the corolla tube (essentially as in various members of the *lanceolatae*, notwithstanding the key in Rydberg's Flora of Colorado): style exserted about 2 mm.: filaments a little broader than the anthers, and much longer than them, inserted in the throat of the corolla, the intervals with bunches of hairs.

A very hairy member of the *lanceolatae*, recalling *M. fendleri* and *M. bakeri*. *M. fendleri*, which I have collected in New Mexico, but do not now possess, differs in the calyx, and as I recall is a different looking plant. It has never been found in Colorado. *M. bakeri* is high alpine (11000-13000 feet), and the quite differently formed leaves have no lateral nervures. *M. fusiformis* Greene is much smaller, with the stem leaves tapering at base.

On May 16, 1907, Charles Euler, Frank Lindsley and other members of the second year class of the State Preparatory School brought in a quantity of *Mertensia* for use in class, all collected in the immediate vicinity of the town. To my astonishment, I found the present species represented by several specimens, which appear to have been collected by Charles Euler in a dry spot near the mouth of Boulder canyon. The plant is dedicated to the second year class of the Preparatory School.

University of Colorado, Boulder, Colorado.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—III

By A. A. Heller

Unless a statement is made to the contrary, all the species mentioned in this paper may be found on the ridges west of Los Gatos, where they have been observed and collected by myself.

March

Sisyrinchium bellum Wats. *Blue-eyed grass.*

The handsome flower of this plant might more appropriately be called yellow-eyed, for its bright violet blue has a well marked yellow center. It is common in grassy places, sometimes growing in dense patches, and then adds much to the beauty of the landscape. The flower of this species, commonly nearly a half inch in diameter, is one of the largest in the genus. Its range is throughout California in the coast region. The more inland forms have been described as distinct.

Salix Bakeri Seem. *Willow.*

Our commonest as well as earliest blooming willow is apparently this species, described several years ago from specimens collected near Stanford University by Mr. C. F. Baker. It is one of the forms commonly referred to *S. lasiolepis*, and is a many stemmed branching shrub, or occasionally a small tree, the oblong leaves deep green and shining above, pale beneath.

Ranunculus Californicus Benth. *Buttercup.*

During the latter part of the month the meadows and waysides are enlivened by the appearance of this species, with its ten or more glossy yellow petals, the expanded flower a half inch or more in diameter, the typical plant smooth or nearly so. It was originally collected near San Francisco, but referred to another species. The specimens which Bentham had on hand when he published the name were collected in "woods near Monterey," and this no doubt should be considered the type lo-

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cality. The species is said to occur in the coast region throughout the whole length of the State.

ESCHSCHOLTZIA CROCEA Benth. *California poppy.*

A perennial species, one of the most beautiful in the genus, its large glossy flowers orange red. It is apparently the only species in this neighborhood, equally at home in the valley and on the hillsides, beginning to bloom in March or earlier, but is not in its glory until April, when great golden areas of it are seen. Some have confounded it with *E. Californica*, which grows in the sand hills about San Francisco, but our plant is always more upright in growth, has a larger, more pointed bud, a different torus, and the color of the flowers different from the beginning. Most species have smaller and paler flowers as the season advances. Originally collected somewhere in the coast region by Douglas.

RIBES SUBVESTITUM H. & A. *Gooseberry.*

This elegant species has long been confused with *R. Menziesii* from the northern coast of California, but differs from it in flower structure as well as in the golden yellow berries. It is common in our hills at elevations of from 500 to about 2000 feet. The young branches are very spiny, glandular as are also the leaves and berries. The sepals are maroon or brownish, the broad white petals showing well above them when in full anthesis. It is commonly four or five feet high, the stalks numerous. As to distribution, it may be confined to Santa Clara and San Mateo counties, but perhaps occurs north of the bay in Marin.

VIOLA PEDUNCULATA T. & G. *Yellow pansy.*

In places the hillsides are thickly dotted with this beautiful species from the latter part of March well into April, growing in mat-like masses when not disturbed, dozens of blossoms springing from a single clump of plants. It is found in the coast region from at least Sonoma county south to San Diego.

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CEANOTHUS CUNEATUS Nutt. *Wild lilac.*

While not our commonest species, the white flowers of this may be detected here and there on our hillsides near the end of the month always a component part of the chaparral. The branches are stiff and rigid, somewhat spine pointed; the leaves are thick and leathery, pale beneath, an inch or less in length.

SANICULA BIPINNATIFIDA Dougl.

Rather common on grassy hillsides, the lower leaves resting on the ground. The flowers are collected in dense heads, and look like little brown balls. This does not much resemble any of the eastern species when in flower, and when one sees it for the first time he is liable to consider it anything but a *Sanicula.*

SANICULA BIPINNATA H. & A.

Near the end of March this species may be found, with us growing in open grassy places. Much less common than *S. bipinnatifida*, but usually a number of plants in close proximity. The plant is slender, a foot or two high, the leaves cut into narrow segments, the flowers pale yellow, small and inconspicuous.

PHACELIA DIVARICATA (Benth.) Gray

Observed for the first time this spring in a neighbor's orchard, and possibly introduced, as it was found only about trees which had been manured last year. The plants were six or eight inches high, usually with several branches from near the base. The pale violet blue flowers are several in a cluster, from a half to three-quarters of an inch across, the short tube filmy and transparent-looking, as are also the spaces between the veins on the petals. The appendages of the petals extend from the base of the ovary to the top of the tube, and consist of a thin membrane, the edges raised and curved inward, almost touching each other. The stamens are as long as the petals, hairy at the middle, the anthers greenish. The style is a little shorter than the stamens, hairy except at the two-cleft apex.

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EDITORIAL

The appearance of the April number in June may seem strange to some, but there are good reasons. The editor does not have an independent income, and the spring and summer months are the ones wherein he must labor hardest to provide funds for the balance of the year. This journal is far from being an income producer, but is issued because we know just such a publication is needed. There may probably be other delays in publication, but the whole twelve numbers will be issued by the end of the year.

The editor is certain that other people have eyes, and would like to have tangible proof that they are used to good advantage. There are many things awaiting discovery, or if they have been observed, have not been put into print. Our note about the flowers of *Pentstemon heterophyllus* on another page is a case at point. Many items of that kind are awaiting discovery, and we should like to have you report them. Do not leave everything for the editor. He does not have time.

There is a point in Mr. Osterhout's article on the Flora of Colorado to which we wish to call attention, namely, the stability of names. We think many people confuse two different propositions under this head. Many radical not to say startling changes have appeared of late, but the majority of them have to do simply with the segregation of families, genera and species. No question of stability is concerned in such changes. The elimination of *Euphorbia*, for instance, from our flora, is the natural result of discovering that true *Euphorbia* does not occur within our bounds, and the species hitherto referred to it are assigned to the several genera to which they rightfully belong. We think the changes which have been made with priority in view, but which have failed of accomplishment will prove to be few in number. Two such cases come to mind—*Vleckia* instead of *Agastache*, and *Spiesia* instead of *Aragallus*. Some one who has time might enumerate the failures as well as those which have stood the test.

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Volume 3 August, 1907 Number 5

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
Box 58, Los Gatos, California.

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Volume 3 No. 5

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, AUGUST 8, 1907

NOTES ON THE FLORA OF SAN MATEO AND SANTA CLARA COUNTIES, CALIFORNIA

BY STEWART H. BURNHAM

The following are some of the more important field notes made from the fall of 1893 to May, 1895, while in attendance at Leland Stanford Jr. University. Many excursions were made from the foothills to the summits of the outer Coast Range, besides an extended "roughing it" trip to the Yosemite and neighboring Sierras during the summer vacation. Early in 1894 Dr. Edward Lee Greene's "Manual of the Botany of the Region of San Francisco Bay" appeared, and the work was found to be very helpful, as no descriptive flora of this region had before been published. At that time, 1894, some of the collections extended the range of the species, and a few of the following were omitted from the Manual. Specimens of most of the species mentioned are still preserved in my herbarium.

DICHELOSTEMMA CAPITATUM (Benth.) Wood

The flowers are usually blue-purple, but pure white flowered plants were found along the lower Coal Ridge road, from the summit of Black mountain, May 8, 1895. The species was also collected in the Yosemite valley and at Crockers.

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Dichelostemma insulare (Greene)

Brodiaea insularis Greene, Bull. Cal. Acad. 2: 134. 1887.

Plants closely resembling this species were found among old iron hoops at Searsville dam, May 11, 1895. The plants were large and stout, with leaves 4-7 mm. wide, and perhaps may be luxuriant specimens of *D. capitatum*.

DICHELOSTEMMA MULTIFLORUM (Benth.) Heller

This species is frequent in the mountains of northern California and the Sierras, but was not discovered south of San Francisco until April 13, 1894, on the hills west of the Palo Alto stock farm, growing with *D. congestum* which it closely resembles. It begins to flower about two weeks earlier than *congestum*, and was in flower as late as May 18, 1895.

SCOLIOPUS BIGELOVII Torr.

Abundant in mountain woods at Summit Springs, west of Redwood City, February 24, 1894, and March 9, 1895.

POLYGONUM EMERSUM (Michx.) Britton

About a little pond on Weeks Brothers ranch, near La Honda, October 13, 1894. The surface of the pond was covered with *Azolla filiculoides*, and this is perhaps the station where Brandegee discovered the *Azolla*. The *Polygonum* is said to be rare in California.

TISSA MACROTHECA (Hornem.) Britton

Alkali soil, by roadside from the University to Searsville, January 6, 1895.

RANUNCULUS CALIFORNICUS CANESCENS Greene

Low grounds, Castro Indian mound south of Mayfield, February 11 and November 17, 1894.

DENDROMECON RIGIDUM Benth.

A medium sized shrub with coriaceous entire leaves and solitary, large yellow flowers. Page Mill road to Black mountain, March 26 and May 8, 1895. Also collected in the Sierras,

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between Raymond and the Mariposa Big Trees, on Silver Peak, June 12, 1894.

PAPAVER CALIFORNICUM Gray

Rocky thickets; from San Mateo to Black mountain, April to May.

BIKUKULLA FORMOSA (Andr.) Coville

In a wooded ravine near the summit of Black mountain, March 26, and May 8, 1894. In flower also at Tamarack Flat, July 7, 1894, near the Yosemite.

RORIPPA LYRATA (Nutt.) Greene

Lake Lagunitas at the University, October 19, 1894.

RIBES AUREUM Pursh

This shrub, described under the reinstated name *R. tenuiflorum* Lindl. by Dr. Greene, was found in a few localities in company with other shrubs, especially the poison oak. The flowers appear in March, and lack the spicy fragrance of the flowering currant of the Missouri region, which is now known as *R. longiflorum* Nutt. A few shrubs grew along the Arroyo Francisquito at Palo Alto in 1894, but it was more abundant about the base of Black mountain near Hidden Villa, and less so along the lower Coal Ridge road. Mr. Elmer I. Applegate also found it in 1894, near Alum Rock, east of San Jose.

PRUNUS SUBCORDATA Benth.

Branches of this native shrub, attacked by the black knot of the east, *Plowrightia morbosa*, was collected November 10, 1894, along the lower Coal Ridge road.

GLYCYRRHIZA GLUTINOSA Nutt.

Palo Alto to San Francisco bay, August to September, 1894.

LATHYRUS BOLANDERI Wats.

This species is frequent on wooded slopes from San Mateo to Black mountain from mid December to April. The leaves vary from ovate to lanceolate.

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VICIA FABA L.

The Windsor or horse bean was collected in a grain field, May 8, 1895, along the lower Coal Ridge road. It was afterwards seen in gardens at Mayfield.

LIMNANTHES ALBA Hartw.

Collected on the grassy hillside above Palo Alto stock farm, winter of 1895.

LIMNANTHES DOUGLASII R. Br.

Conspicuous plants with the yellow petals tipped with white were found in a grain field on Burke's ranch, east of Searsville, April 13, 1894, and April 6, 1895.

EUONYMUS OCCIDENTALIS Nutt.

Poison oak thickets on the banks of Arroyo Francisquito near Searsville dam, May 11, 1895.

RHAMNUS CROCEA Nutt.

Chaparral near Hidden Villa, April 26, 1895.

CEANOTHUS CUNEATUS RAMULOSUS Greene

Black mountain road above Hidden Villa, March 24, 1894.

MALVASTRUM ARCUATUM (Greene) Robinson

Above the rock crusher near Adlanta Villa on University campus, and along the Black mountain road near Hotaling's, April 26, 1895.

HELIANTHEMUM SCOPARIUM Nutt.

Black mountain road, May 8, 1895.

LYTHRUM ADSURGENS Greene

Low grounds, University to Black mountain.

EPILOBIUM FRANCISCANUM Barbey

Capitola, Santa Cruz county, August 8, 1894; Summit Springs, September 15, 1894.

GARRYA ELLIPTICA Dougl.

This characteristic shrub is not uncommon on the northern slopes and ridges of Black mountain, and is in flower in February and March.

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TRICHOSTEMA LANCEOLATUM Benth.

Dry roadside near the summit of Black mountain, November 10, 1894. An annual herb with a pungent odor.

PHYSALIS IXOCARPA Brot.

A rare Californian plant found in flower September 8, 1894, in the bed of Arroyo Francisquito near Adlanta Villa.

MIMULUS CARDINALIS Dougl.

Banks of Arroyo Francisquito, Palo Alto to San Francisco Bay, August 28, 1894. This showy species was also collected in July in the Sierras along the trail to Yosemite point, and along the trail from Hetch Hetchy valley to Lake Eleanor.

VERONICA BYZANTINA (S. & S.) B. S. P.

In a garden above Searsville, about a mile below the stopping place of the Pescadero stage, February 22, 1895.

THALESIA FASCICULATA (Nutt.) Britton

Thickets, Black mountain road, May 8, 1895. Also collected in June of the previous year, on Silver Peak in the Sierra Nevada.

DIPSACUS FULLONUM Mill.

The fuller's teasel was found along the lower Coal Ridge road and in low grounds about Castro Indian mound. It is a tall coarse biennial with large connate stem leaves which during the wet season are often partly filled with water and drowned insects.

SCABIOSA ATROPURPUREA L.

A single specimen of this garden plant was found at Frenchman's lake on the University campus in April, 1895, by Miss Susan G. Stokes.

CARDUUS AMPLIFOLIUS Greene

Shores of Phelp's lake, May 8, 1895.

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CHRYSOMA ARBORESCENS (Gray) Greene

Near the watering trough, half way up the mountain to Summit Springs, in flower September 15, 1894.

CNICUS BENEDICTUS L.

The blessed thistle was found along the drives at the University, May 1, 1895.

PETASITES PALMATA (Ait.) Gray

The sweet coltsfoot of the northern United States was collected in moist shady ravines southwest of Searsville, at Hidden Villa, and near Adlanta Villa. The flowers appear in March and April before the palmately lobed leaves.

SENECIO HYDROPHILUS PACIFICUS Greene

Low grounds, November 17, 1894, about Castro Indian mound.

State Museum, Albany, N. Y.

RAILLARDELLA MUIRII Gray. This species, which so far as known, has been collected only by John Muir and at some unknown locality, is quite abundant on the walls and floor of Tehipite canyon. It grows in clumps and attains a height of about a foot. I collected good specimens there in August, 1905, but they were all destroyed in the San Francisco fire.

PELTIPHYLLUM PELTATUM is plentiful on the banks of a little creek that flows from Milwood, Presno county, to the middle fork of King's river. I believe this is its most southern station in the Sierra Nevada.

TRAUTVETTERIA GRANDIS Nutt. This is another northern plant which I found in the Kings river region. Its published range is west Idaho and British Columbia to Plumas county, California. The specimens that I collected in August, 1905, grew in a little meadow watered by a rivulet which appeared to belong to the north fork of Kings river. It was along a trail leading over Roger's Ridge to Tehipite canyon.

ALICE EASTWOOD.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—IV

By A. A. Heller

Unless a statement is made to the contrary, all the species mentioned in this paper may be found on the ridges west of Los Gatos, where they have been observed and collected by myself.

April.

Carex Hookeriana Dewey

This species is not credited as growing in our region, but it is not uncommon in the hills in grassy places. It grows in clumps in rather dry ground, the slender stems numerous. Determined by Theodor Holm.

Festuca octoflora Walt.

Plentiful in 1904 on the burnt over area on the ridge southwest of Los Gatos, growing in tufts. It is not uncommon in the State.

Bromus rubens L.

This European grass has become well established in California, growing in fields and vacant lots, although it is not so plentiful with us as it is in the southern part of the State.

Poa Howellii Vasey and Scribn.

Found sparingly near the summit of the first ridge southwest of Los Gatos in dry ground along an old road. Not recorded from this region by Jepson. "California to Oregon in woods and swamps," is the range as originally given.

Anticlea Fremontii Torr.

This species, commonly known as *Zygadenus Fremontii*, inhabits brush covered slopes or sometimes may be found in moist grassy places in the hills. The flowers are nearly an inch in diameter, creamy, with a greenish-yellow gland near the base of each segment. Under the original description specimens are

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cited from near Oakland, Santa Cruz and Monterey. During the spring of 1904 it was very abundant on a burnt over area on the ridge southwest of Los Gatos. It is not known outside of the coast region, and extends north to at least Mendocino county.

CALOCHORTUS ALBUS Dougl.

Rather common on wooded slopes in rich loose soil or even in grassy fields. The flowers of our plant, and indeed in all specimens that I have seen from the Coast Range, are tinged with purple, and this form is no doubt the typical one, since Douglas collected only in the coast region. To my mind this species should be remanded to the genus *Cyclobothrya*, under which it was originally described.

TRILLIUM OVATUM Pursh

A resident of damp shady woods in rich, loose soil, with us found mostly among the redwoods. It was found this year between Saratoga and the summit of the Coast Range, but not plentifully. The type was collected by Lewis "on the rapids of the Columbia River." It is said to extend southward to Santa Cruz.

TRITELEIA LAXA Benth.

This showy plant is common in the hills about Los Gatos, growing either in grassy places or in open wooded tracts. Our form, with large, but not the largest, deep violet blue flowers, is apparently the typical one, as compared with the colored figure of the original. Specimens were also collected this year among the hills back of Alum Rock Park.

VAGNERA SESSILIFOLIA (Baker) Greene

Not uncommon on moist northerly wooded slopes in loose, rich soil, many stems often growing from the slender branching rootstocks. Easily distinguished from the next, which sometimes grows in close proximity, by the few and comparatively large flowers. The species is widely distributed, the original

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range being from "British Columbia to California and New Mexico."

VAGNERA AMPLEXICAULIS (Nutt.) Greene

This grows in places similar to the preceding, but perhaps more commonly in drier ground. It has a simple stout root-stock, marked with scars representing growths of previous seasons, while the flowers are quite small, numerous in short dense racemes. The type was collected by Wyeth "in the valleys of the Rocky Mountains about the sources of the Columbia River."

IRIS DOUGLASIANA Herbert

A plant referred to this species, but which I have always considered distinct, is common on the hills about Los Gatos, the flowers creamy yellow, delicately veined with purple, rarely the entire flower purplish or bluish. It is common all through the mountains in this section, being found also in Santa Cruz county. Definite knowledge concerning the type of *I. Douglasiana* must be obtained before one can satisfactorily place this plant.

SALIX LAEVIGATA Bebb

A tall shrub growing in moist places or along streams; one of the two common species in this vicinity. The long, pointed leaves are bright green and shining above, pale beneath. It always flowers later than *S. Bakeri*, the other common species. One of the original specimens was collected at Santa Cruz. In one form or another it is widely distributed in the State.

QUERCUS DOUGLASII H. & A. *Blue oak.*

A tree 20 to 30 feet high with rounded outline, not common with us, found up to an elevation of 1000 feet. The leaves are only slightly lobed as a rule, blue-green in color. It is said to occur throughout middle California, and is most common on the low hills bordering the great interior valley.

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RUMEX PROCERUS Greene

Under the original description this species is said to be "confined to wet, boggy depressions among the coast hills about San Francisco Bay and Monterey." Plants which appear to belong here are found in dry ground along the road near our place, but it is also found in wet places in the vicinity.

CLEMATIS LASIANTHA Nutt.

Abundant on the hills about Los Gatos, climbing over shrubs. A handsome plant when in bloom or when covered by the silky, long tailed fruits. It also occurs in the Mt. Hamilton range, and has been collected by the writer as far north as Mendocino county.

DELPHINIUM NUDICAULE T & G.

Collected late in April this year on moist wooded slopes back of Alum Rock Park on a northerly exposure, the plants growing on and near moss covered rocks. It was also found near the summit of Mt. Hamilton in similar situations. It was seen on the east side of the Sierras in July, between Beckwith and Red Clover valley, Plumas county, at an elevation of at least 5500 feet, in woods near a stream.

DELPHINIUM PATENS Benth.

Not uncommon here and there in thickets and on wooded slopes. It is found on the hills near our place, in Los Gatos canyon, on the hills about Alum Rock Park, and at the foot of Mt. Hamilton near Smith Creek. It has commonly been confused with *D. decorum*, a very different plant which occurs on hills near the sea. The flowers of *D. patens* are a rich violet-purple. In our vicinity it is the only bluish colored species in bloom during March and April.

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COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

THE GENUS ERIOGONUM, by Michael Gandoger, Bulletin de la Societe Royale de Botanique de Belgique, **42**: 183-200. July 10, 1906.

Only the new forms described in this paper are given here, followed by the page number. Geographical inaccuracies are corrected whenever evident.

E. Abertianum ruberrimum 185. Flores subsessiles intense rubri, fructus purpurei 2 m. late, alae planae obtusae, panicula pauciflora. Hab. Mexico, prov. Chihuahua ad Casas Grandes (Townsend and Barber n. 369).

Var. **neomexicanum** 185. Flores longe pedunculati pallidi vel albidi, fructus vix dilute rubidi 3 m. lati, alae crispulo-erosae, panicula ampla repetite ramosa. Hab. New Mexico, in Organ Mountains, Dona Ana county, altitude 4500 feet (Wooton n. 427).

E. arizonicum 186. Affinis praecedentis a quo longe differt foliis inferioribus lineari-oblongis subtus niveis caulinariis duplo longioribus ac angustioribus mucronatis dense villosis, involucris longe pedunculatis foliaque saltem duplo superantibus solitariis nec glomeratis, perigonio albo 2-3-plo minore. Hab. Arizona ad Bill Williams Mountain, altitude 7000 feet (MacDougal n. 311).

Species a vero *E. Abertiano* et habitu et inflorescentia tam abunde recedit ut ab eo vix aut vix appropinquare videatur typumque sane constituens.

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E. alatum Macdougalii 186. Totum subpatule hirtum, folia radicalia oblonga pilosa, involucrum hirtum, fructus vix alatus oblongo-attenuatus. Hab. Arizona circa Flagstaff (MacDougal n. 259).

Var. **brevifolium** 186. Adpresse hirtum, folia radicalia obovata vix ciliosa, involucrum glabrum, fructus late alatus ovatus. Hab. Wyoming, in collibus elatis ad Laramie (A. Nelson n. 1980).

E. anemophilum Cusickii 186. Specimina a cl. W. Cusick ex eastern Oregon in deserto of Harney sub n. 2603 edita a typo recedere videntur statura humili, foliis niveis, floribus umbellatis paucioribus, involucro lurido glabro albido-marginato.

E. angulosum rectipes 186. Vix ramosum pauciflorum, involucri pedes recti, flores albidi. Oregon ad Malheur River (W. Cusick n. 1954).

Var. **patens** 187. Superne ramoso-confertum, pedunculi patentes densiflori, flores extus macula rubra notati. Hab. Nevada ad Wadsworth (Hillman).

Var. **pauciflorum** 187. A basi ramosum, pedunculi semipatuli pauciflori, folia rotundata, flores albidi. Hab. Nevada ad Reno (Hillman).

Var. **flabellatum** 187. A basi ramosissimo divaricatum, ramis flabellatis floribundis, ped. recti, folia ampla obovata, flores albidi. Hab. California, in Sierra Nevada ad C. P. Entrance (Hillman). [This locality is meaningless to me, but I trust some one can tell what it really does mean.—Ed.]

E. annuum pauciflorum 187. Simplex superne nudum, corymbus laxus pauciflorus, folia angustata undique canescentia. Hab. Wyoming, ad Cambria Canon (Nelson n. 2536).

E. Hitchcockii 187. Praecedentis subspecies a quo recedit caule densè folioso ramoso-virgato, foliis supra araneoso-

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canescentibus acumine torto uncinato, calyce obtuso mutico multo minus aperto, perigonii segmentis saltem duplo minoribus basi fuscatis. Hab. Kansas, in Hamilton Co. (A. Hitchcock n. 445).

E. juncinellum 187. Est forma peculiaris ab *E. Baileyi* recedens caule minus ramoso glauco paucifloro, involucris parum costatis, floribus saltem duplo longius pedicellatis. Hab. Arizona, ad Grand Canon of the Colorado, alt. 7000 ped. (MacDougal n. 182).

E. salicornioides 187. Plantula 2-5 pollicaris a basi ramosa ramis intricato-dichotomis glabris luridis, folia suborbiculata subtus tomentosa, involucra parva costata glabra breviter dentata, flores pauci vix pedunculati lutescentes minuti. Hab. E. Oregon (W. Cusick, 1898 sine num.).—Prope *E. Baileyi* certe collocandum sed ob staturam humilem salsolaceam floresque lutescentes etc. toto coelo diversum.

E. caespitosum alyssoides 188. Folia laxiora longius petiolata, pedicelli villosi, fructus minores. Hab. Wyoming, ad Transton (Nelson n. 4516).

E. nevadense 188. Frutescens vix caespitosum caudiculis paucis laxis erectis praeditum, folia late oblonga acuta longe attenuato-petiolata tomentosa, scapus foliis 3-4-plo longior glaber monocephalus, involucrum virescens grosse costatum subsessile apice ciliatum, perigonium pallidum quam in *E. Douglasii* triplo minus. Hab. Nevada ad Reno (Hillman).

E. elatum limonifolium 188. Involucrum majus sed parum angulosum, flores dilute rosei extus vix hirtelli majusculi, folia ampla eis *Statices scopariae* etc. simillima. Hab. Oregon, frequens in meridionalibus dictis Blue Mountains (Cusick n. 2189).

Var. **erianthum** 188. Involucrum minus 4 m. longum acute angulosum, flores purpurei extus copiose hirsuti minores,

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folia minora molliter villosa. Hab. Nevada, Stampede, Elko Co. (P. B. Kennedy n. 563).

E. fasciculatum oleifolium 189. Folia lineari-oblonga 4-5 m. lata subtus dense tomentosa, cymae simplices pauciflorae, flores extus villosi. Hab. California, ad San Diego (Schamo).

E. aspalathoides 189. Folia linearia 1-2 m. lata lucida subtus albo-glauca sed vix hirta, cymae trichotomae dense multiflorae, flores extus glabri. Hab. California, Los Angeles in collibus ad San Rafael (C. Crandall). Suffrutex elegantissimus speciem propriam probabilius constituens. [This is perhaps intended as a variety of *E. fasciculatum*, but the way the name is printed should indicate a species.—Ed.]

E. flavum foliatum 189. Folia subobtusa, cymae sat copiose foliatae, involucra parum sericea. Hab. Colorado, prope Fort Collins (C. Crandall).

Var. **linguifolium** 189. Folia anguste lanceolata, cymae aphyllae, involucra valde sericea. Hab. Montana, ad Great Falls (Blankinship).

E. leucocladum 189. Ramosissimo-intricatum totoque incano-tomentosum, rami graciles repetite verticillati sat divergentes, folia orbiculata obtusa basi subcordata undulata tenuiter petiolata undique tomentosa, involucra axillaria sessilia bracteis 2 acutis instructa, flores (juniores) ut in *E. gracile* quacum convenit sed ob indumentum statim obvium. Hab. Nevada, ad Reno (Hillman).

E. heracleoides micranthum 189. Flores parvi globosi. Hab. Washington, in Spokane Co. (Suksdorf n. 693).

Var. **viride** 190. Flores majusculi plerumque 3-3½ m. lati, folia ovata parva undiqne glabra viridia, cymae simplices pauciflorae, perigonium amoene luteum. An species propria? Hab. Nevada, ad Peavine [mountain near Reno] (Hillman).

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Var. **multiceps** 190. Folia oblonga subtus dense tomentosa, radicalia lanceolata, caudiculi plures adscendentes, cymae multiflorae, perigonium saepe ad apicem purpureum. Hab. E Oregon, frequens inter 3-4000 ped. (Cusick n. 1732).

Var. **utahensis** 190. Folia superne floccoso-araneosa, radicalia obtusa. Hab. Utah, ad Cache (J. Linford).

Var. **Rydbergii** 190. Folia superne glabra et viridia, radicalia obtusa. Hab. Montana, in alpinis ad Indian Creek, alt. 7000 ped. (P. Rydberg and A. Bessey n. 5336).

E. Jamesii simplex 190. Radix lignosa crassa elongata, scapus simplex pauciflorus, flores majores 7 m. longi, cymae confertae. Hab. Kansas, ad Canons, Logan Co. (Hitchcock n. 446).

Var. **neomexicanum** 190. Radix tenuis suffrutescens, scapus superne repetite dichotomus ramis divaricatis, flores vix 5 m. longi, cymae laxaepauciflorae. Hab. New Mexico, in White Mts., Lincoln Co., alt. 6000 ped. (E. Wooton n. 385).

E. longifolium longidens 190. Folia radicalia superne pilosa 1 cent. lata, sepala 7 m. longa lanceolata. Hab. Florida, in pinetis arenosis ad Polk Co. (L. Ohlinger n. 302).

Var. **gnaphalifolium** 190. Fol. rad. superne glabra 5-6 m. lata longissima (15-18 cent.), sepala 4 m. longa acuta. Hab. Florida, prope Eustis (Hitchcock).

Var. **floridana** 190. Fol. rad. superne glabra 5-6 m. lata 7-8 cent. longa, sepala 7 m. longa lanceolata. Hab. Florida, ad Tampa (C. Williamson).

Var. **Lindheimeri** 190. Fol. rad. superne glabra 1 cent. lata 11 cent. longa, sepala 3 m. longa vix acuta crassa lateque triangularis. Hab. Texas (E. Lindheimer, 1849-51).

Var. **caput felis** 191. Fol. rad. superne pilosula saltem 2 cent. lata saepius 2-3 cent. longa, sepala ut in praecedent. sed

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multo magis sericeo-lanata incana. Hab. Indian Territory, ad Creek Nation (J. Kimmons, 1895).

E. Macdougalii 191. Inflorescentia villoso-lanata. Fruticulus tortuosus basi decumbens toto foliosus, folia linearia 1½ cent. longa 3 m. lata mucronata superne araneosa, cymae simplices trifurcatae pauciflorae, involucrum villosum vix costatum, bracteae ad apicem subulatae. Hab. Arizona, ad Grand Canon of the Colorado (MacDougal n. 176).

E. myrianthum 191. Inflorescentia glabra, cymae multiflorae confertae repetite trichotomo-ramosae, folia oblonga obtusa 2 cent. longa 5 m. lata superne glabra; involucra glabra ovato-subcampanulata, flores albi numerosissimi. Fruticulus rectus ramosissimus usque ad mediam altitudinem foliosus, rami superne floccosi. Hab. Colorado, ad Fort Collins, ad 5000 ped. (C. Crandall), Wyoming, ad Blue Grass Creek (A. Nelson n. 362.)

E. spathulare 191. Cymae 6-9 florae laxae divaricatae inv. oblongo-tubulosa basi attenuata. Humile rectum ramosum ramis glabris inferne foliosis, folia oblongo-spathulata obtusa superne glauca glabra, cymae pauciflorae trifidae glaberrimae glaucescentes, bracteae longe aristatae. Hab. Oregon, in sterilibus ad Maurey's Mts. (Cusick n. 2698).

E. intricatum 191. Involucra ovata-campanulata, folia 1-2 cent. longa 3 m. lata superne sparsim araneosa acuta. Humile basi decumbens ramosissimo foliosum ramis caduce araneosis, cymae glabrae laxae pauciflorae, involucra parva obtuse costata, bractae vix acutae, perigonium album. Hab. Montana, in collibus siccis (Townsend, 1899).

E. helichrysoides 192. Folia 4-5 cent. longa, involucra sessilia ad oras contracta, rami adscendentes floccosi, folia falcata 2 m. lata conferta, cymae densae, pedicelli breves crassi pauciflori. Hab. Kansas, ad Canons, Gove Co. (A. Hitchcock n. 448).

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Volume 3 September, 1907 Number 6

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
Box 58, Los Gatos, California.

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Volume 3 No. 6

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, SEPTEMBER 17, 1907

COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

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(*Continued from page 88.*)

E. sarothriforme 192. Involucra pedicellata ad oras aperta, rami tortuosi glauco-virides glabri, folia rigida 4-5 cent. longa 3-4 m. lata laxa, cymae effusae remote trifurcatae, pedicelli longiores, perigonium album ut in caeteris sed submajus. Hab. Colorado, ad Glenwood Springs, Garfield Co. (G. Osterhout).

E. niveum Suksdorfii 192. Folia radicalia minora basi longius attenuata, fructus obovato-oblongus alis carneis, involucro 4 m. longa prominule costata. Hab. Washington, in rupestribus ad Cheney (W. Suksdorf n. 944).

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Var. **candelabrum** 192. Folia rad. 10-14 m. lata basi truncata vel subcordata, fructus ovatus alis albis, involucra 3 m. longa vix costata. Hab. Oregon, ad Snake River (Cusick n. 2128).

E. ochroleucum macropodum 192. Folia 1 cent. lata dense albo-tomentosa, scapus incrassatus, fructus lutescens. Hab. Montana, ad Indian Creek, alt. 7000 ped. (Rydberg and Bessey n. 5344).

Var. **decalvans** 192. Folia 3-4 m. lata marginibus demum glabrescentia, scapus tenuis, fructus albidus. Hab. Montana ad Trail Creek, Park Co. (J. Blankinship).

E. flavissimum 193. Scapus flexuosus apice trichotomus, folia longe petiolata limbo oblongo, cymae densissime capitatae, flores fructusque flavissimi. Hab. Oregon, frequens in collibus ad Silver Creek, Harney Co. (Cusick n. 2617).

E. Cusickii 193. Scapus rigidus apice trichotomus, folia tenuiter longeque petiolata limbo ovato-elliptico, cymae laxiflorae unifariam subracemosae, flores fructusque albidi. Hab. Oregon, ad m. Creek, Grant Co. (Cusick n. 1691).

Var. **californicum** 193. Scapus subflexuosus trichotomo-corymbosus, foliorum limbus orbiculatus, cymae densiflorae capitatae, flores fructusque albido-ochroleuci. Hab. Nevada, ad Stampede, Elko Co. (P. Kennedy n. 543).

E. ovalifolium nevadense 193. Scapi decumbentes, folia griseo-canescentia, flores flavissimi capitati. Hab. Nevada, Reno ad Truckee River (P. Kennedy sine num.).

Var. **deltoideum** 193. Scapi recti rigescentes, f. niveo-tomentosa limbo deltoideo, flores lutei confertissimi. Hab. Montana, ad Madison River (J. Blankinship).

E. dichroanthum 193. Scapi recti sparse araneosi, folia tomentosa longe petiolata limbo orbiculato-deltoideo basi cor-

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dato, flores capitati densissimi aurantiaci cum macula purpurea ad dorsum quamque in praecedentibus longius pedunculati, fructus orbiculatus. Hab. Wyoming, ad Cokville (Nelson n. 4658 ex parte). Folia eis *E. nivei* Benth. similia.

E. ovalifolium utahense 194. Scapi recti, limbus foliorum ovato-deltoideus 10-12 m. latus longe petiolatus, flores albidi. Hab. Utah, ad Cache (J. Linford).

Var. **multiscapum** 194. Scapi plures rigidi, folia nivea conferta limbo obovato 5-6 m. lato longe petiolato, flores ochroleuci dorso lineato-virides. Hab. Wyoming, ad Cokville (Nelson n. 4658 ex parte).

Var. **cyclophyllum** 194. Scapi pauci flexuoso-decumbentes, folia lanata confertissima limbo orbiculato 2-4 m. lato vix petiolato, flores albidi dorso viriduli. Hab. Montana ad Great Falls (J. Blankinship). Facies *E. caespitosi* Nutt.

Var. **cerastioides** 194. Scapi recti pauciores, folia lanata confertissima limbo obovato-oblongo utrinque attenuato 2-3 m. lato vix petiolato, flores albidi. Hab. cum praecedente.

E. rubidum 194. Caespitosum nanum, scapi 2-3 pollicares obliqne adscendentes, folia nivea breviter petiolata limbo ovato vel orbiculato basi cordato aut cuneato 2-4 m. lato, flores capitati minores rubidi, involucra parva lanata obtuse dentata. Hab. Oregon, versus cacumen Stein's Mts. ad Wild Horse Creek (Cusick n. 2039).

Var. **frigidum** 194. Limbus foliorum 5-6 m. latus ellipticus, flores subnivei. Hab. Montana, ad Old Hollowtop, Pony, alt. 9000 ped. (P. Rydberg and E. Bessey n. 5338).

E. roseiflorum 194. Caespitosum nanum, scapi plures recti sparse araneosi, folia breviter petiolata orbiculata 4-5 m. lata, flores capitati dilute rosei ad dorsum linea intense purpurea notati, involucra lata tomentosa acute dentata. Hab. Oregon, in arenosis ad Cycan Valley (Cusick n. 2751); California, in re-

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gione Nevadensi ad Sierra Valley (J. Hillman). Ab antecedentibus bene distinctum.

E. Piperi ochrocephalum 195. Involucra 6 m. longa, pedunculi florales hirsuti, perigonium ochroleucum brevius villosum. Hab. Oregon, ad Trout Creek in Wallowa Mts., alt. 6-8000 ped. (Cusick n. 2433).

Var. **longiflorum** 195. Involucra 8-9 m. longa, ped. florales glabri, perigonium flavissimo-aureum majusculum longissime villosum. Hab. Montana, ad Columbia Falls (R. Williams).

Eriogonum polyanthum Benth. Species duae sequentes huic sunt affines:

E. marginale 195. Totum sparse araneosum, caudiculi sessiles diffusi, folia obovato-oblonga marginato-subrevoluta crassa acuta floccosa saepius ad margines purpurea, petioli rubri, inflorescentia corymbosa pedunculis pubescentibus, flores aurei 3½ m. longi. Hab. Colorado, ad North Park, Larimer Co. (G. Osterhout).

E. glaberrimum 195. Virescens glaberrimum, caudiculi longe stipitati recti, folia ad apicem caudiculorum fasciculata suboblongo-spathulata crassa obtusa marginibus subrevoluta, petioli virides breves, inflorescentia capitata vel potius ad scapum capita 2-3 longe pedunculata, flores ochroleuci 5½ m. longi. Hab. Oregon, in arenosis ad Cycan Valley (Cusick n. 2745).

Var. **aureum** 195. A specie differt foliis ovato-ellipticis, inflorescentia corymbosa aurea pedicellis pubescentibus. Forma mixta inter *E. glaberrimum* et *E. marginale*. Hab. Wyoming, ad Ferris Mountains (Nelson n. 4953).

E. polycladon mexicanum 196. Folia plana, flores intense rosei vel purpurei. Hab. Mexico, Chihuahua ad Casas Grandes (C. Townsend and C. Barber n. 374).

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Var. **crispum** 196. Folia crispo-undulata, flores pallide rosei aut albidi. Hab. New Mexico, in Organ Mts. ad Dona Ana Co. (Wooton n. 460).

E. racemosum sagittatum 196. Folia longe petiolata oblongo-subsagittata basi truncata superne viridia. Hab. Colorado, ad Durango, alt. 6500 ped. (C. Crandall).

Var. **cordifolium** 196. Folia breviter petiolata orbiculata obtusa basilate cordato-emarginata undique albo-tomentosa. Hab. Arizona, ad Flagstaff, alt 7000 ped. (MacDougal n. 262).

E. reniforme asarifolium 196. Folia 2-3 cent. lata superne viridia basi late cordata sinubus subcontiguis, scapus et inflorescentia glabra, involucrum vix costatum. Hab. Nevada, ad Reno (Hillman).

E. praebens 196. Folia orbiculata obtusa cordata undique albo-tomentosa 1 cent. lata tenuiter petiolata; scapi plures recti araneosi ramis verticillatis superne dichotomis copiose instructi, involucra axillaria remota ovata-tubulosa costato-angulata tomentella dentibus triangularibus, flores albidi glabri. Hab. California, ad Sierra Valley (Hillman). Facies antecedentis a quo inflorescentia etc. mox secernitur.

Var. **divaricatum** 196. Rami intricato-divaricati, flores tenuiores. Hab. Nevada, ad Leavine [Peavine mountain near Reno] (Hillman).

E. sphaerocephalum Dougl. Inter formas varias duae sequentes, ut subspecies, praecipue distingui possunt:

E. cupreum 196. Caudiculi pauciores, scapi albo-tomentosi elongati, folia ovata utrinque breviter attenuata superne araneosa subtus dense tomentosa, inflorescentia corymbosa, dentes involucri triangulares, pedunculi glabri, flores luteo-cuprei. Hab. Idaho, in montosis (J. Linford).

E. halimioides 197. Caudiculi numerosi intricati foliosi, scapi breves puberuli virides, folia oblongo-linearia apice

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attenuata basi valde contracto-acuta in petiolum latum producta superne glabra viridia subtus glauca breviterque tomentosa, inflorescentia corymboso-subcapitata, dentes involucri obovati, pedunculi villosi, flores ochroleuci. Hab. Oregon, ad Snake River (W. Cusick n. 1912).

E. subalpinum arachnoideum 197. Folia inferiora superne arachnoideo-canescentia. Hab. Montana, ad Fort Ellis propre Bozeman (J. Blankinship)

Var. **vulcanicum** 197. Folia ovata omnia superne glabra et viridia, pedunculus involucri brevissimus ideoque inflorescentia capitata. Hab. Yellowstone N. Park, ad Harris Geyser Basin (J. Blankinship).

Var. **stenophyllum** 197. Flores 2½ m. longi, folia oblonga acuta 4-5 m. lata. Hab. Montana, ad Spanish Basin, Gallatin Co. (Rydberg and Bessey n. 5335).

Var. **subnivale** 197. Flores 4½ m. longi, folia oblonga subobtusa, 6-8 m. lata. Hab. Wyoming, in Garfield Peak (Nelson n. 664).

E. tenellum grandiflorum 197. Folia 3-4 m. lata subobtusa cymae repetite trichotomae multiflorae, perigonium 3 m. longum, involucra pedicellata. Hab. Utah, ad Rich (J. Linford).

Var. **sessiliflorum** 198. Folia 3 m. lata acuta, cymae trichotomae pauciflorae, perigonium 2 m. longum, involucra glabrescentia sessilia. Hab. Nevada, ad Reno (Hillman).

Var. **erianthum** 198. Folia 5-6 m. lata undique canescentia, cymae trichotomae pauciflorae amplae laxae, perigonium 1½ m. longum, involucra lanata pedicellata. Hab. California, ad Truckee in Sierra Nevada (Hillman),

E. Thurberi Parishii 198. Limbus f. ovato-ellipticus bullato-crispulus, scapi subteretes laxiflori, involucrum papillo-

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sum, pedunculi recti. Hab. California merid., ad S. Bernardino (Parish n. 2820).

Var. **acutangulum** 198. Limbus f. orbiculatus planus, scapi acute angulosi conferte floriferi, involucrum laeve, pedunculi patuli. Hab. [Nevada], Virginia Mountains (Hillman).

E. thymoides pallens 198. Folia glabrata superne viridia longiora, flores albo-carnei vel pallide rosei. Hab. Oregon, ad Union (Cusick n. 1880 part).

E. umbellatum Crandallii 198. Scapus floccosus, folia obovata superne glabra viridia, cymae breviter pedunculatae, flores aurei 3 m. longi. Hab. Colorado, ad Fort Collins, alt. 5-6000 ped. (C. Crandall; J. Cowen).

Var. **chrysanthum** 198. Scapus laevis, folia ovata superne glabra viridia, cymae longe pedicellatae, flores aurei 4 m. longi. Hab. Oregon, frequens in montosis, alt. 3-4000 ped. (Cusick n. 1733 sub nom. *E. heracleoides* var. *minus*).

Var. **nevadense** 198. Scapus floccoso-tomentosus, folia obovato-spathulata superne glabra viridia, cymae breviter pedicellatae, flores ochroleuci 3½ m. longi longe pedunculati. Hab. Nevada, ad Reno (Hillman).

Var. **cladophorum** 198. Ramosissimum, caudiculi laxe foliosi elongati numerosi, folia suborbiculata undique incano-tomentosa, flores 4 m. longi aurei. Hab. Yellowstone Park, ad Upper Geyser Basin (P. Rydberg and E. Bessey n. 5330).

Var. **dichrocephalum** 199. Conferte ramosum, caudiculi dense foliosi breves, folia ovata utrinque acuta undique incano-tomentosa, flores 5 m. longi ochroleuco-flavescentes cum macula rubida extus ad dorsum. Hab. Oregon, ad top of Stein's Mountain (W. Cusick n. 1965).

Var. **californicum** 199. Parce ramosum, caudiculi rari conferti foliosi, folia obovata dense lanata obtusa, flores 5 m.

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longi ochroleuci. Hab. Nevada, ad Peavine [mountain near Reno] (Hillman).

E. vimineum rigescens 199. Scapi stricti inferne lanati, folia subtus dense lanuginosa superne araneoso-canescentia ovata, flores intense purpurei vel rubri, involucrum ad faucem contractum 4½ m. longum virens prominule angulosum. Hab. Nevada, ad Verdi (S. Doten).

Var. **californicum** 199. Scapi flexuoso-divaricati prorsus glabri, folia subtus breviter lanuginosa superne viridia, orbiculato-deltoidea vel subhastata, flores intense purpurei vel rubri, involucrum ad faucem apertum 3½ m. longum rubens vixque angulosum. Hab. California, ad Petaluma (I. Tidstrom).

Var. **divergens** 199. Folia superne virescentia, inflorescentia divaricata ramulis laxis divergentibus, involucrum 3½ m. longum ad dentes ciliatum, perigonium album. Hab. Nevada, ad higher Peavine [mountain near Reno] (Hillman).

Var. **oregonense** 199. Folia undique incana, inflorescentia stricta ramulis confertis rigidulis, involucrum vix 3 m. longum ad dentes glabrum, perigonium dilute roseum cum linea purpurea ad medium dorsi. Hab. Oregon orient., frequens in arenosis (Cusick n. 2163).

E. restioides 199. Strictum ramosissimum habitu restiaceo, scapi glabri multoties repetite 2-3-4 chotomi paniculam densam efformantes, folia longe petiolata orbiculato-reniformia obtusa basi cordata subtus tomentosa superne viridia sparseque araneosa, involucra sessilia axillaria 2½ m. longa pauciflora glabra angulata obtuse dentata, flores albi minutissimi 1½ m. longi. Hab. Nevada, ad Reno (J. Hillman).

Affinis *E. viminei* Dougl. a quo habitu peculiari restiones nonnullos capenses vel australasicos revocante, inflorescentia foliisque conspicue recedit.

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CYPRIPEDIUM FASCICULATUM IN SANTA CRUZ COUNTY, CALIFORNIA

By Alice Eastwood

Some years ago this was sent to me for identification from Glenwood, in the Santa Cruz mountains. In the same year it was also brought to me by Mr. Horace Davis, who found it on his country place near Glenwood. It was described by Watson in the Proceedings of the American Academy, **18**: 382. 1882. The specimens had been given the above name by Dr. A. Kellogg.

As the description has not come into any of the manuals of California botany, it seems well to reprint the description.

"Dwarf (2-6 inches high) the villous-pubescent stem scariously sheathed at base and bearing a pair of nearly opposite ovate, acutish leaves (2-4 inches long): peduncle viscid-pubescent ½ to 1½ inches long, with a small lanceolate bract in the middle: flowers solitary or usually several in a terminal cluster, bracteate, greenish: sepals and petals lanceolate, acuminate, 6-8 lines long, brown-veined, the lower sepals wholly united or very nearly so: lip depressed, ovate, greenish-yellow with brown purple margin, 4-5 lines long: sterile anther obtuse, equalling the stigma. Collected by W. N. Suksdorf on the White Salmon River, Washington Territory, above the falls in May, 1880; by Mrs. R. M. Austin in May, 1881, near Prattville, Plumas County, California; and at some time previous by Mr. Bradley, probably in the mountains of Del Norte County [California]. Resembling *C. guttatum* of Alaska."

In the Brandegee herbarium at the University of California, the species is represented by specimens from Mr. Suksdorf, May, 1886; Mrs. Austin from Butte valley, 1870; Grave Creek Hills, Oregon, collected by Thos. Howell, and in Washington in 1883 by T. S. Brandegee when on the North Transcontinental Survey, being number 1095 of the collection.

This new locality in Santa Cruz county is noteworthy on account of its great distance from the other recorded localities.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—V

By A. A. Heller

Unless a statement is made to the contrary, all the species mentioned in this paper may be found on the ridges west of Los Gatos, where they have been observed and collected by myself.

April—*Continued*

Ranunculus hebecarpus H. & A.

Rather common in thickets or on wooded stream banks, but probably often overlooked on account of its small size and insignificant flowers. Our particular plant has been called var. *pusillus* Brewer and Watson. It is an aberrant member of the genus, commonly having but a single petal, four spreading sepals, four stamens, and six pistils. Professor Greene has given a very interesting account of this plant in the Bulletin of the Torrey Botanical Club, **14**: 116. 1887. I have collected it about Los Gatos and at the foot of Mt. Hamilton in this county, near Santa Rosa in Sonoma county, and in the Sierra foothills back of Chico, Butte county.

Platystemon leiocarpus F. & M.

What is apparently this species according to Fedde (P. *emarginatus* Greene), was found in grassy places on the ridge southwest of Los Gatos in 1904, at an elevation of at least 1800 feet. The type of *emarginatus* was collected on "foothills near Stanford University," and our plant seems to be the same. If Fedde's determination is correct, the type of *leiocarpus* must have been collected on the hills at some distance from the sea, and not on Bodega Point where nearly all the seeds and specimens collected by the Russians were obtained.

Cardamine oligosperma Nutt.

This was collected on stream banks back of Alum Rock Park, growing in wet shaded places in the woods. It is a small

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plant, liable to be passed by, for its minute white flowers are not large enough to attract attention. Jepson does not record it from so far south, giving its range from "Oakland Hills and Marin Co. northward to Napa Valley and Mendocino Co."

CHEIRANTHUS CALIFORNICUS Greene

Plants collected on the hills back of Alum Rock Park were referred to this species. So far as noticed, the flowers are bright orange with no indication of paleness in age as in the type, which had "flowers large, yellow, fading to cream color." Our plant frequents gravelly hillsides in rather dry places, but usually near trees.

GUILLENIA LASIOPHYLLA (H. & A.) Greene

This plant, formerly included under *Thelypodium*, is not uncommon with us, being found occasionally on grassy banks. It was collected this spring in the hills back of Alum Rock Park growing near rocks. It is widely distributed in California, occurring even on the Mojave desert, and is quite variable.

TILLAEA ERECTA H. & A. (*T. minima* Miers.)

A little plant resembling somewhat the staminate flowers of the oak, the short stems only an inch or two high, commonly growing in tufts either on the ground or on rocks. It is fairly common everywhere in the hills, but in 1904 was very abundant and luxuriant on burnt places southwest of Los Gatos.

RIBES GLUTINOSUM Benth.

Common in the mountains back of Saratoga at medium elevations. This may be easily distinguished from *R. malvaceum* by its later blooming, much greater size, more branching habit, thinner leaves, and much larger cluster of redder flowers, the calyx segments merely spreading, not rotate. It often has a trunk nearly two inches in diameter with smooth gray bark, and is often eight to ten feet high. Originally collected by Douglas, probably near Monterey, it is found only in the coast region from Monterey north to Sonoma county.

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DRYMOCALLIS GLANDULOSA (Lindl.) Rydb.

Known also as *Potentilla glandulosa*, this species is rather common on hillsides about thickets or overgrown fence rows. It has been collected about Los Gatos at elevations of 600 to 1000 feet, and at 2100 feet at Smith Creek at the foot of Mt. Hamilton.

FRAGARIA CALIFORNICA C. & S.

Apparently not very common in our region, since I have seen but little of it. Specimens were collected in a canyon near Lexington, the plants growing on a grassy bank near trees and shrubs.

CERASUS CALIFORNICA Greene

The wild red cherry is found here and there on the hills at elevations of nearly 1000 feet. It is a shrub six or eight feet high with slender ascending wand-like branches, the small red fruit very bitter. It is commonly known as *Cerasus* or *Prunus emarginata*, but that is an arborescent species whose home is the wet country west of the Cascade mountains in Oregon and Washington, and if it may be found in California at all, it will be only near the ocean in the extreme northwestern part of the State.

Anisolotus parviflorus (Benth.)

Hosackia parviflora Benth. Bot. Reg. **15:** under *pl. 1257.* 1829.

Lotus micranthus Benth. Trans. Linn. Soc. **17:** 367. 1837.

Hosackia microphylla Nutt.; T. & G. Fl. N. A. **1:** 326. 1838.

Plants referred to this rather common species were collected in 1904 in the burnt over area on the ridge southwest of Los Gatos. They were much more mat like and spreading than usual. Years ago, before having had an oppottunity to see in the field so many of the species formerly referred to *Hosackia* and later to *Lotus*, I expressed the opinion that they do not all

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belong to one genus. Now after having studied them in the field I am still more convinced that they should be kept separate, and the generic names *Hosackia*, *Anisolotus* and *Syrmatium* restored.

Anisolotus strigosus (Nutt.)

Hosackia strigosa Nutt.; T. & G. Fl. N. A. **1**: 326. 1838.
Lotus strigosus Greene, Pittonia, **2**: 141. 1890.

Found at the same place as the last, and abundant. It is an inhabitant of gravelly hills, widely distributed in the State, especially south of San Francisco Bay. The type was collected by Nuttall near Monterey.

HESPERASTRAGALUS GAMBELLIANUS (Sheldon) Heller

An inconspicuous plant, the branches often not more than three or four inches long. It is found in gravelly ground, sometimes in orchards and sometimes on grassy slopes. Formerly known as *Astragalus nigrescens*, the peculiar pod marks this as one of the most distinct of the *Astragalus* segregates. The small bluish flowers are clustered in elongated heads.

LATHYRUS PUBERULUS White

With us the earliest bloomer in this genus, sometimes appearing early in March. The leaves are short woolly, dull green, the flowers rather large, tinged with purple. It is a low species, twining over shrubs and other vegetation on open hillsides. The range is from Sonoma county south to at least Santa Clara.

LUPINUS POLYCARPUS Greene

A form of this species is found in our orchard, flowering and fruiting early. It is a homely species, the blue flowers small and inconspicuous. This form which occurs about Los Gatos, principally on grassy banks, is apparently not the typical one.

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TRIFOLIUM ACICULARE Nutt.

A common clover in orchards, along roadsides, or in grassy fields. The purplish corollas are showy, the banner marked with a deep purple spot. The narrow leaflets end in a conspicuous apiculation. It has commonly been confused with *T. tridentatum*.

TRIFOLIUM BIFIDUM Gray

This species, originally from Contra Costa county near Mt. Diablo, is rather plentiful on the hills about Los Gatos, growing in fields or about thickets. The narrow leaflets are deeply notched, the flowers small and pale.

TRIFOLIUM GRACILENTUM T. & G.

Common in fields and orchards, an almost prostrate mat like form abundant at places in the hills. The flowers vary from almost salmon color to deep purple-red.

TRIFOLIUM MICRODON H. & A.

A small plant, often hidden among other clovers. The pale flowers are subtended by a conspicuous involucre with a truncate base. It is rather common on open hillsides.

TRIFOLIUM NEOLAGOPUS Loja.

A variable plant, sometimes small and sometimes large, the small purple flowers usually concealed by the long dove colored calyx lobes. Our plant has been confused with several species, notably *columbinum* and *albopurpureum*, but it seems to be this long unrecognized species. It is rather commen on our hills and widely distributed from this point southward to at least Riverside county.

TRIFOLIUM OLIGANTHUM Steud.

A slender plant with few small pale flowers, the leaves narrow. With us it occurs on grassy hillsides in gravelly soil, or even in orchards.

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EDITORIAL

A crying need at present is the revision of all the large genera. We hear or are led to suppose that certain genera are being revised by certain botanists, yet years pass and not even a synopsis appears. Even if the work is not sufficiently advanced for full treatment, a key compiled from what has already been published would be an immense help. It is simply impossible to satisfactorily determine many of the species in a general collection, when one does not have the time to work over the whole genus. I am willing to do my part, and would have taken up some genus long ago if the time had been at my command. However, before long I hope to issue an account of the genus *Lupinus* in Santa Clara county California, preparatory to a revision of the species occurring in the State, and later may extend the work to include all the species in the United States.

At the "international" botanical congress held in Vienna two years ago, it was decided, presumably by European botanists, that beginning with 1908, all descriptions of new plants should be printed in Latin. We understand that there was a large minority vote cast against this proposition, and from the standpoint of the American botanist rightly so. Presumably European botanists are competent to write correct Latin descriptions, but we on this side are not, and we have no cause to feel ashamed about the matter. The study of the dead languages is no longer insisted upon in the majority of our colleges and universities. Especially is this true in the scientific courses offered, and botanists are supposed to take a scientific course. It is true, the most of us could with some practice and after many humiliating mistakes, muster a fairly good Latin description, but what necessity is there for it? We are an English speaking nation; the most of us are interested in American plants only; there are enough of us in this country to properly look after our own flora if we are diligent about it, and why should we afflict ourselves with plant descriptions written in an alien language?

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The writing of descriptions in Latin means that the study of botany should be restricted to the few who have special facilities in the way of herbaria and literature plus an intimate knowledge of Latin, whether they are really good botanists or not. A man who knows nothing whatever of Latin may be a far better botanist than one who can write a faultless Latin description. He may have gained his knowledge direct from Nature's workshop in the woods and fields, and *really* know plants instead of thinking he knows them, as is the case with the man who works chiefly with dried material. Let us not deprive this botanist—the *real* botanist—of the chance to read plant descriptions written in a language which he understands.

While upon the subject of descriptions, there is another phase of the matter sadly in need of attention. We want descriptions that describe. Some people do write them so that the plant can be recognized when one meets it, but others do not. A description which may fit any one of a half dozen related species is of no earthly use whatever, and the name that accompanies it might as well be classed as a *nomen nudum* at once. When one wishes to verify a plant he naturally turns to the original description if he has no trustworthy material for comparison. That description should be as complete as possible. Every part of the plant should be carefully examined, and *all* the characters noted. And if possible the plant should be a fresh one, not a dried one. This advice should be carefully digested not only by beginners, but by those who have already written many descriptious. Brevity is a good thing sometimes, but not in the case of an original plant description. Some very important character is likely to be overlooked if we discard any feature as of no special value.

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Volume 3 October, 1907 Number 7

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
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Volume 3 No. 7

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, OCTOBER 26, 1907

NOTES ON SPHAEROSTIGMA

BY DR. A. DAVIDSON

The *Sphaerostigma bistorta* group of the Onagraceae has always been a puzzling one to amateurs, and it has been a point of much debate among the small fraternity of botanists here, as to what constitute the various species of this group. With the view of forming some definite conclusions for my own satisfaction I have examined all the available herbarium material on the coast, and the results I shall here detail.

The specimens examined were those of the Universities of California and Stanford, and the private herbaria of S. B. Parish and F. M. Reed. Mr. Reed has taken a special interest in this family, and has made very large collections, chiefly from Riverside and neighborhood. In the herbaria of the Universities the Onagraceae of southern California is very well represented, thanks to the activity of Messrs. Hall and Abrams, but middle and northern California are not as well represented as they might be. Southern California has for some reason been much more thoroughly explored than any other part, so it is impossible at present to give anything like an accurate idea of the general distribution of any genera represented throughout the State.

The authors of the Botany of California have placed *veitchianum* as a variety of *bistorta*, and in a note appended to the description of *micranthum* say "it is probably a mere variety of

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bistorta." If the flowers were removed from some specimens of *veitchianum*, there is no doubt that it would be impossible to distinguish between the two, so that *S. micranthum*, in the light of our present knowledge; can only be separated from some specimens of *S. veitchianum* by the size of the flowers. This is not as definite a difference as systematists would wish, but *micranthum* and *veitchianum* are very variable, and we are left to conclude that as in some others of the Onagraceae variations are frequent and naturally produced, or hybridization is common.

If experiments prove the stability of the various forms, a number of new varieties will require to be established for both these species. Abrams in his "Flora of Los Angeles and Vicinity" gives the most accurate description of the various species and their general distribution, which I cannot improve upon, but shall add some of the details gathered from examination of the various herbaria.

Of S. BISTORTA (Nutt.)Walp. there are specimens in the Universities of California, Stanford, and Parish's herbaria, from the type locality near San Diego. These, with two from Ballona, Los Angeles county, Abrams 300, are the only typical specimens of this species in the combined collections. The fruit of this species is short, comparatively stout, 2 lines or more in width, and quite different from that possessed by the inland forms that have heretofore passed for *bistorta*. This plant is apparently absolutely confined to the costal sands. Abrams gives its limits as San Diego to Santa Barbara. All the inland forms have longer and narrower fruit with a more attenuate beak, are generally more foliaceous and spreading, and may at present all be classed as *S. veitchianum*.

S. VEITCHIANUM (Hook.) Small, is a common plant in southern California from the borders of the Mojave desert to San Diego. A plant from Springville, Ventura county, University California 20423, is the most northerly point represented. The typical *veitchianum* from around Los Angeles is almost smooth in its lower parts and hairy towards its flowering points; but

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many plants from a drier region, well represented in Reed's collection, are hairy throughout; while others seem quite glabrous. They vary too in the form of the foliage and habit of growth, but intergrade to such a degree as to render definition by me impossible. The desert plant described below seems worthy of specific rank.

S. Hallii n. sp. Annual: stems simple, erect, 6 to 9 inches high: whole plant pale with an appressed pubescence on leaf and to a lesser degree on stem: lower leaves narrowly lanceolate, 3 lines wide, 1 to 2 inches long, tapering to a narrow petiole; the upper leaves sessile, shorter, all firm and entire, or with a very few minute and remote teeth, tipped with a dark short mucro, not undulate: flowers large, nearly 1 inch wide, petals light yellow with dark spot at base: calyx covered with soft hairs: capsule pubescent, 4-angled, narrow, ¾ inch long, contorted but not coiled.

Banning, Riverside county, California, Hall 446, April 17, 1897 (type); Coyote canyon, Colorado desert, Hall 2791; Taquitz canyon, Colorado desert, Davidson 1746.

S. MICRANTHUM (Hornem.) Walp. is distributed over all the maritime regions and in the interior valleys of the south. The typical plant of this species is, I presume, the ordinary moderately hirsute, semi-prostrate form found from San Francisco southward. In the coast region round Los Angeles there are two well marked forms. One, the congesta form, has very congested foliage, with the leaves larger and more hirsute, and with very small flowers; the other, the macrocarpa form, with the same foliage, has the short stout capsule of *bistorta*. The latter is the rarer form, examples of which are found from Los Angeles, San Diego, and Lower California. A typical interior form is found in Parish's collections from San Bernardino county, and is frequently met with in other interior valleys. It is to the eye quite smooth in all its parts.

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S. HIRTELLUM (Greene) Small, is a good and quite distinct species, and not a merely hirsute variety of *micranthum* as some have supposed. It is most readily recognized by the hirsute, undulate-crisped leaves, triangular in outline on the stem, and in herbarium specimens appressed to the stem, whereas those of *micranthum* are lanceolate or oblong in outline, and stand at an acute or even right angle or secund to the stem. The purplish stem and the more erect and simple habit of the plant further help to identify it. This plant seems widely distributed in the northern half of the State. From the south there are the following specimens: Las Tunas canyon, Santa Monica, Abrams 1703; Arroyo Seco, Los Angeles, Greata 312.

S. BISTORTA REEDII Parish, is, I think, the mountain form of *S. hirtellum* as found south of Los Angeles: Strawberry peak, Abrams 2008; Santiago peak trail, Abrams 1792; Wilson peak, Los Angeles county, Davidson 1749; Bluff's ranch, Riverside, Reed 554; Campo, San Diego county, Abrams 3558. Many of the plants from Wilson's peak have lacerate petals as in the type, but this is likewise a feature of some that are undoubtedly genuine *micranthum*. This variety differs somewhat from the true *hirtellum* in being less hirsute and less foliaceous, and has sufficient character to warrant a varietal name. If I am correct in assuming that this plant is a variety of *hirtellum*, the name *S. bistorta Reedii* becomes obsolete. I shall name it *S. hirtellum* var. **montanum.**

S. PALLIDUM Abrams. Two plants of this species from Palm Springs are the only ones in the herbaria. They are Grant 6750, and Davidson 1090. Palm Springs is the type locality. The plant is the desert representative of *S. micranthum*, and bears the same relation to *micranthum* as *S. Hallii* bears to *S. veitchianum*. Both, so far as the meagre collections indicate, are limited to the Colorado desert.

Los Angeles, California.

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COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

SAGITTARIA ARIFOLIA NUTT. IN NORTH DAKOTA. By J. Lunell, Bull. Leeds Herb. **1**: 1-4. S. 3. 1907.

The only representatives of the genus *Sagittaria* known to me within the state are the plants whose present names are *S. arifolia* Nutt. and *S. cuneata* Sheldon. Fr. Buchenau in Engler's Pflanzenreich IV. 15. p. 49, from his distant German study correctly pronounced *S. cuneata* a "species dubia affinis *S. arifoliae*." I have made a study of these plants with an endeavor to penetrate the mystery enveloping the actual relationship between them.

The plant springs up from a winter bulb, who has the size from a small pea to a hazel nut. This emits a crown of phyllodes if water covers it; else, if exposed to the air, it brings forth *ab initio* linear leaves, having the same size and position as the phyllodes.

If the winter bulb is situated in the mud 1 or 2 feet beneath the surface of the water, it emits in the first place a bunch of small phyllodes. One of these phyllodes commences shooting upwards. It is a tiny, tender one, and it has a considerable length when it reaches the surface. A few days later another small phyllode pushes itself up in the same way, and a few phyllodes, one at a time, try the same experiment, in order to enjoy the air and the sunlight, though the majority of them remain small phyllodes of the original kind. The *growing* phyllodes who do not reach the surface of the water are identical with the long kind described in the text-books under *S. cuneata*. When the long phyllodes have reached the air, a lamina is formed.

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This is at first minute and linear, then it grows larger and passes gradually into one or more different forms, as linear-lanceolate, lanceolate, elliptical, oval, falcate, cuneate with narrow wings, and cuneate or sagittate with broad wings. The scape and all the other parts of the plants are constantly becoming more slender and thin than if the plant has been exposed to the air from the bud or in its early growth. In short, the plant expends all its energy in its endeavor to reach the surface and the air, and, on that ground, becomes tiny and slender.

Next, we follow the growing process of a plant with the winter bulb placed in the mud 2 or 3 inches beneath the surface of the water. On account of the easiness to reach the air and the short distance from the surface, more small phyllodes sprout, and long phyllodes have no occasion to be formed. The phyllodes who reach the surface get leaf blades, all of them being developed in the order described above. The remaining small phyllodes continue being attached to the plant in a rosulate arrangement. All the parts of the plant become more stout and plump.

At last, we have to consider the conditions when the winter bulb is growing in mud without a coating of water. Then no phyllodes at all grow from the origin, and the first leaves are linear, and gradually, one by one, enter into some of the different forms enumerated above, until they, as fully developed, become sagittate, or they are sagittate almost from the bud, with short, stout, bent petioles, and larger leaf blades, flowers, bracts and fruits.

In conformity with the above representation, I suggest the following description of

SAGITTARIA ARIFOLIA Nutt.; J. G. Smith, Rep. Mo. Bot. Gard. **6**: 7. *pl. 1.* 1894; Britton and Brown, Ill. Fl. **1**: 89. 1896; Fr. Buchenau, Pflanzenreich, l. c.—*S. sagittifolia* L. var. *minor* Pursh, Fl. Am. Sept. **2**: 395. 1814.—*S. variabilis* Engelm. var. *hastata* formae b et c pro pte. Macoun, Cat. Can. Pl. **4**: 77-78. 1888.—*S. sagittaefolia* L. vel *variabilis* Engelm. aut. Amer. div.

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—Glabrous, perennial. Scapes 5-90 cm. long, weak, usually longer than the leaves. Petioles 4-80 cm. long; leaf blades, when fully developed, saggitate, with the basal lobes one-fourth to one-third the length of the laminae. Inflorescence verticillate-racemose. Bracts lanceolate to ovate, acute, of variable length and shape, and not very reliable for identification purposes. Fertile peduncles ascending, not reflexed in fruit, short; the sterile usually twice as long. Fruit globose, 1-1½ cm. in diameter. Beak of the achene less than one-fourth its length.

I have subdivided the species as follows:

1. Var. **monomorpha** Lunell. Terrestrial or emersed. Stout and plump. Scapes 5-20 cm. high, erect or ascendent. Petioles 4-18 cm. long, usually curved outwards. Leaf blades all sagittate, broad, acute, with divergent basilar lobes. Bracts lanceolate, often as long as the fertile pedicels. Achenes about 2 mm. long.

2. Var. STRICTA J. G. Smith, l. c. 8. *pl. 1.* Buchenau, l. c. —Scapes erect, more strict, 30-40 cm. high; bracts ovate, acute. Terrestrial. A large var. *monomorpha.*

3. Var. **dimorpha** Lunell. Only the lowest part of the plant is covered with water. Leaves abundantly developed and sagittate as in var. *monomorpha*, except 1 to 3 lanceolate or oval, and 1 to 3 phyllodes. Turns into var. *monomorpha* under favorable conditions.

4. Var. **polymorpha** Lunell. A form showing characters mixed from the terrestrial and submersed forms, as part of the plant is exposed to the air, and part is submersed in water. It has phyllodes, but comparatively fewer than var. *cuneata.* It has leaf blades on long and stiff petioles raised above the surface of the water, and with all the different formations varying from linear to sagittate. In general appearance it stands nearer to var. *cuneata* than to var. *monomorpha.*

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5. Var. **cuneata** (Sheldon) Lunell. *S. cuneata* Sheldon, Bull. Torr. Bot. Club, **20**: 283. *pl. 159.* 1893; J. G. Smith, in Rep. Mo. Bot. Gard. **6**: 8. *pl. 2.* 1894. Britton and Brown, Ill. Fl. **1**: 89. 1896; Buchenau, l. c.—Plant submersed, rooting in mud, maybe sometimes in sand too, slim and slender. Scape 20-100 cm. long, with the verticillate flowers reaching the surface of the water. Leaves with long petioles, their blades floating on the surface, sagittate, very much smaller in size than in the preceeding varieties. Bracts ovate-lanceolate, usually shorter than the fertile pedicels. Achenes about 1 mm. long. This variety has phyllodes, some linear, attenuate, nearly reaching the surface of the water, others lanceolate, 6-12 cm. long, 4-8mm. broad, rosulately arranged around the base of the scape.

Conditions favorable to the growth of long phyllodia are: 1, sufficiently deep water; 2, when the power for a continued growth in developing a lamina is exhausted; and 3, when the phyllode is too young for the formation of a leaf blade, in which case a blade will come later, if the season is not too far advanced. The petioles of the floating leaves are very fragile indeed, and many of these leaves who simply lost their laminae by accident, pass as long phyllodes.

Besides this plant, the long phyllodes are found in the European *Sagittaria sagittaefolia vallisneriaefolia* and in *Alisma arcuatum angustissimum*, and the basilar phyllodes are constant in *Sagittaria cristata* Engelm., *S. teres* Wats., *S. graminea* Michx., and *S. subulata* (L.) Buchenau.

I have collected var. *cuneata* in places where many thousands of individual plants were growing, and nothing but this typical variety could be found. The year was a wet year. The next year happened to be a dry year, all the water disappeared from the surface of the ground, and the plants were transformed into terrestrial plants. Not a single var. *cuneata* was found, but in their place just as many typical var. *monomorpha*! This observation has been repeated—and the reverse of it—in different places and through whole seasons, and furnishes a most con-

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vincing evidence that I dealt all the time with one and the same species, varying according to its different stations of life.

The gradual sinking of the water level during dry summers has a tendency to produce an abundance of var. *dimorpha* and var. *monomorpha*, just as the gradual rise of the water level in wet summers causes an increase in the numbers of var. *polymorpha* and var. *cuneata*.

Typical specimens of var. *polymorpha* and var. *cuneata*, with the gradual lowering of the water level and the disappearance of the water, are transformed into typical specimens of var. *dimorpha* and var. *monomorpha*. Here the same process is observed as when *Alisma arcuatum angustissimum* is changed to *A. arcuatum lanceolatum* (*vide* J. Lunell, The Genus Alisma in North Dakota, in *Botanical Gazette*, **43**: 213. 1907). But with the rise of the water, the reverse does not occur more than to a certain extent. Var. *dimorpha* and var. *monomorpha* then become more slender, but the leaves are not changed to phyllodes. The analogy between *Alisma arcuatum* and *Sagittaria arifolia* in their habits and through their whole processes of life is very striking and wonderful indeed.

A rise and a fall in the water level, emersion or submersion, or rooting in the *terra firma*, wet or dry summers, etc., are factors to be earnestly considered when an effort is made with a view of explaining the different formations of these most variable plants.

My investigations warrant the following conclusions:

1. When the plant is submersed in the water, or a few leaves and the scape are reaching the surface of the water, a pure var. *cuneata* will be the result.

2. When the plant grows in *terra firma* or in very shallow water, allowing the leaves and the scape immediately to rise into the air, a pure var. *monomorpha* is the inevitable result.

3. When part of the plant is emersed, and part submersed, a formation with mixed characters is the result—(when the conditions are more terrestrial) var. *dimorpha*, or (when the conditions are more aquatic) var. *polymorpha*.

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UNREPORTED PLANTS FROM THE VICINITY OF LOS ANGELES, CALIFORNIA

By H. E. Hasse

Arctostaphylos diversifolia Parry. This shrub, attaining a height of 2 to 2.5 meters, with a trunk 2.5 to 3.5 cm. thick, having a thin, grayish, shreddy outer bark, is not uncommon in the dense chaparral of the upper reaches in the central and western part of the Santa Monica mountains. It flowers in June, the racemosely disposed berries ripening to a bright scarlet by the latter part of August. Mr. H. H. Bartlett, Assistant Librarian, Gray Herbarium, writes that it has been reported by Ford from Santa Cruz island, San Diego by Orcutt and Brandegee, Catalina island by Sanford, and All Saints bay by Parry, the last being probably the type locality.

Monardella hypoleuca Gray. In the upper part of Topanga canyon, Santa Monica mountains, flowering July and August.

Sawtelle, California.

The habitat of Polypodium Scouleri

In *The Fern Bulletin* 9: 40-42. 1901, Mr. S. B. Parish has a paper entitled "Southern extension of the range of Polypodium Scouleri." I chanced upon it recently, and note that in speaking of this species, he says: "Although this sometimes grows in the soil, its usual situation is the mossy trunks of trees." I have collected it on the San Bruno hills, San Francisco, and near the shore beyond Pacific Grove, Monrerey county, and at both places it was growing on large granite boulders in crevices where a foothold could be obtained. Both of the localities cited are exposed to the cool ocean winds as well as to considerable fog, and are outside the line of arborescent growth.—A. A. Heller.

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THE FLORA OF SANTA CLARA COUNTY, CALIFORNIA—VI

By A. A. Heller

Unless a statement is made to the contrary, all the species mentioned in this paper may be found on the ridges west of Los Gatos, where they have been observed and collected by myself.

April—*Continued*

Toxicodendron diversilobum (T. & G.) Greene

The poison oak, well known to all, is entirely too common everywhere on our hills. The young leaves are usually reddish. Botanists quite generally, at least in this country, are recognizing the fact that what we have been calling *Rhus* is an aggregate, and are assigning the different species to their proper genera. The type of the genus *Rhus* is *R. glabra.*

Ceanothus sorediatus H. & A.

This "lilac" is one of the common chaparral bushes on our hills, ascending to at least 2000 feet. It is a rather graceful shrub, the branches inclined to droop, the flowers commonly blue, but sometimes white or nearly so. When in bloom it gives color to the hillsides.

Rhamnus crocea Nutt.

A low shrub three or four feet high with numerous ascending and spreading branches, the leaves evergreen, small, rather thick, and commonly yellowish beneath, whence the specific name. It is either quite variable, or a number of distinct forms have been included under this name. It is found about and in thickets, on stream banks or on cool northerly slopes. The type was collected by Nuttall near Monterey.

Helianthemum scoparium Nutt.

This species has been noted at two places near Los Gatos, once on a dry gravelly ridge below the Ralston house, and near the summit of the ridge southwest of the town on a burnt over

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area, where it is plentiful. It occurs on dry ridges as far north as Lake county. Nuttall found it "common on dry hills around Monterey," where it also grows in sandy pine woods, and on the sand hills along the sea shore.

VIOLA OCELLATA T. & G.

This is a woodland species, growing in cool shady places in rich loose soil. The stems are ascending from a decumbent base, the bright green leaves commonly cordate. The petals are white, the two upper ones purple on the back, the lower ones purple veined on the face near the base. It is found from Monterey northward in the Coast Range to Mendocino and Lake counties, attaining an altitude of over 4000 feet at the foot of Mt. Sanhedrin in Lake county. I have not found it near Los Gatos, but several miles back toward the summit of the mountains it is plentiful.

EPILOBIUM MINUTUM Lindl.

A species found in loose gravel on steep slopes. It grows at one place along the road between Los Gatos and Lexington, and no doubt occurs at other places in the county. The type was collected at Fort Vancouver, Washington, on the Columbia river. It is a small spreading plant, with small flowers.

SPHAEROSTIGMA HIRTELLUM (Greene) Small

Found at but one place near the summit of the ridge southwest of Los Gatos, in rather bare gravelly places. Said to be "common in the hill country away from the sea, from Lake Co. and Solano southward."

CONVOLVULUS PURPURATUS Greene

Rather common on our hills, climbing over shrubs and trees or on fences. With us the flowers are always creamy. It is the same as *C. luteolus* Gray, a pre-occupied name, according to Greene, Pittonia, 3: 333. 1898.

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LEPTOSIPHON ANDROSACEUS Benth.

A beautiful species with lilac-purple flowers, rather common on our hills in April and May, growing on grassy slopes, often in large patches. It ascends to an elevation of nearly 2000 feet, and is found in both the Santa Cruz mountains and in the Mt. Hamilton range. *Leptosiphon* has been merged with both *Gilia* and *Linanthus*.

LEPTOSIPHON BICOLOR Nutt.

A small plant with small purplish or yellowish flowers, not infrequent on grassy slopes. Nuttall's type came from near Portland, Oregon, but our Californian plant is said to be the same, and is widely distributed in the State.

LEPTOSIPHON PARVIFLORUS Benth.

Common on grassy slopes at medium elevations, the flowers either yellowish or almost white. It is not so small flowered as *L. bicolor*, but smaller than *androsaceus* and some of the other species.

EMMENANTHE PENDULIFLORA Benth.

Very abundant in 1904 on the burnt over area on the ridge southwest of Los Gatos, the plants large, many of them two feet high. It is a widely distributed species, occurring over much of California, common in the dry regions in the southern and eastern parts of the State.

NEMOPHILA PLASKETTII Eastw.

Common about thickets on moist northerly slopes, one of the first plants to bloom in April. A small, rough, somewhat prostrate plant, the flowers very small, white.

NEMOPHILA NEMORENSIS Eastw.

Abundant under trees in rich soil in the hills back of Alum Rock Park, and in the woods between Alma and Wright's. A rather weak plant, the flowers large for this group, nearly a quarter of an inch in diameter.

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CRYPTANTHE MICROMERES (Gray) Greene

Specimens referred to this species were collected on the high ridge southwest of Los Gatos, where the plant was locally abundant, growing on the edge of a burnt-over area. Santa Cruz is the type locality.

PLAGIOBOTHRYS TENELLUS (Nutt.) Gray

Collected on grassy slopes near the summit of the ridge southwest of Los Gatos. Jepson says "uncommon in our region," and does not record it from south of the Bay, the only station in his range being "Napa mountains." I have collected it also near Monterey and on Mt. Sanhedrin, Lake county. The type was collected in Idaho.

ANTIRRHINUM STRICTUM (H. & A.) Gray

Collected in 1904 on the burnt-over area on the ridge southwest of Los Gatos, where it was common at the time. It is rare in this region, not previously having been reported from points between Arroyo Grande, Monterey county, and Mt. Tamalpais, Marin county.

CASTILLEJA FOLIOLOSA H. & A.

Rather plentiful on a dry slope west of Los Gatos among other low shrubs, the slope facing the east. It is also found in the foothills back of Alum Rock Park.

ORTHOCARPUS DENSIFLORUS Benth.

Common on the hills west of Los Gatos, but apparently not plentiful in the valley or in the hills east of San Jose, where its place is taken by *O. purpurascens*.

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EDITORIAL

Our reprint on "Sagittaria arifolia in North Dakota" by J. Lunell is a very interesting article, and our only regret is that it comes to us second-hand. Botanists of the present generation are accomplishing much good work in the right direction by going into the field and personally collecting many of the plants which later they study in the dried state, but as yet little has been done along the line indicated by Mr. Lunell; yet it is the true way to get at the "life history" of plants.

To my mind the varieties described in this paper represent the true use of the term variety as applied to forms found in nature. A variety should be what the name implies, a form or variation that is liable at any time to revert to the original, or to change into something else, and grows near the species with which it is associated—not a clearly marked form often found many miles from the species under which it is placed. Why is it necessary to name varieties? Since they are not stable, but as has been shown in this article, are influenced by purely local conditions, and change from one form to another and *vice versa* as the conditions change, it seems better to let them go unnamed, merely stating under the description of a species that it runs into certain forms under favorable conditions.

At present I am not willing to admit, on the evidence submitted, that *Sagittaria cuneata* is not a species distinct from *arifolia*. There are three varieties, *monomorpha*, *stricta*, and *dimorpha*, which are plainly the same plant, but between these three and the other two, *polymorpha* and *cuneata*, there is drawn a line, and we find no mention of the crossing of this line. In addition, the figures in the Illustrated Flora show a marked difference in the shape of the seeds of *S. arifolia* as compared with those of *S. cuneata*, a very vital point.

We quite agree with the editor of the *Fern Bulletin* when he says in the April number of that journal that "when a plant is named it is *named*, and no amount of juggling will change

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the facts." The point at issue is the recognition of priority as applied to varietal names. It was decided at Vienna that one may do just as he pleases with a varietal name. He may duplicate it as often as he cares to in the same genus so long as he does not apply it to two forms of the same species, that is, a hundred species in a genus might each have a variety named *pumila*, but no species may have two varieties *pumila;* the same name may be used in a genus for both species and variety; and one may recognize or disregard some other botanist's varietal names at pleasure. To some people this may seem to be a small matter not worth mentioning, but it should be remembered that great things have their beginning in small things. Looseness at this point is the entering wedge for a recession to the good old days as they were before the "reformers" began to demand fair play and the recognition of the law of priority as an applied principle instead of a thing we might say we believe in, yet disregard at will if we happen to be an "authority. If we may do as we please with varietal names, we will after a little do the same with specific and generic ones.

The "American code," published in the current volume of the *Bulletin of the Torrey Botanical Club*, is undoubtedly the most rational yet adopted, and that "a lot of our prominent botanists appear to be following it," is a very good sign. This American code recognizes the rights of the varietal name, and says that it must not be the same as a specific name in the same genus; that any given varietal name may be used but once in a genus, and that it may not be displaced by any other name unless it is a homonym. But there is one interpretation of a homonym to which we do not subscribe, the following being a case at point: The name *robustus* in *Juncus acuminatus* var *robustus* Engelmann, 1868, must be changed and not called *Juncus robustus* (Engelm.) Coville, because in 1879 Watson named another plant *Juncus robustus*. We do not see any valid reason for this ruling, and consider it the one weak spot in an otherwise admirable code.

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Volume 3 December, 1907 Number 8

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
Box 58, Los Gatos, California.

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Volume 3 No. 8

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, DECEMBER 7, 1907

NOTES ON THE FLORA OF PALM SPRINGS

BY S. B. PARISH

Palm Springs is situated on the western rim of the Colorado desert, in a little arm of it which is sheltered under the rugged flank of San Jacinto peak. It is thus protected, to a great extent, from the harsh winds, and the violent sand-storms, which so frequently rage over the open desert, and which have piled up the mighty sand hills glittering in the distance. The acclivities of the encircling mountains are of scorched and naked rock, wholly destitute of soil. The floor of the valley itself is mostly of coarse sand and gravel, the detritus of the surrounding mountains. In the spring the melting snows of San Jacinto fill the narrow canyons with abundant streams of clear, cold water, which soon sinks in the thirsty sands of the desert. A warm sulphur spring rises in the plain, and still retains with the white inhabitants the reputation for healing virtues which, in former times, drew the desert Indians to its waters. The valley has an altitude of only 500 feet above sea level, and its dry, pure air, throughout the winter months, is singularly soft, yet invigorating. The summer heat is excessive, and obliges most of the inhabitants, white and Indian, to seek a cooler climate.

Five families constitute the permanent inhabitants of the palm shaded village; and the Indians, whose reservation occupies the best part of the valley, have dwindled to but twenty-five

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individuals. In the winter the population is much increased, a goodly number of visitors finding shelter in the rustic hotel and its cottages. They are mostly sufferers from tuberculosis, a disease for which the climate is particularly helpful.

Time was when the valley had a much larger population, when a narrow-gague railway connected it with the main line of the Southern Pacific, and a stone-lined aqueduct conducted the floods of the distant Whitewater to its thirsty soil; when it was dotted with homes and embosemed in orchards and vineyards. But years of drought came, the indispensable water failed, and to-day trees and vines are dead, the aqueduct is filled with drifted sand, the houses are abandoned, and straight across the desert stretches the bare road bed of the railway, stripped of its iron and ties. It is a depressing scene of misdirected enterprise and disappointed hopes.

The earliest scientific visitor to the valley was Professor William P. Blake, who encamped at the springs on the 15th of November, 1853, while engaged on the Pacific Railway surveys. His report contains an interesting note on the vegetation of the place, but no botanical collections were made. In 1876 Parry and Lemmon made the first botanical exploration of this part of the Colorado desert, and gathered here, and at Whitewater, many rare and interesting species, not a few of which were made known to science through their collections. Mr. W. G. Wright was a frequent visitor in 1877-78, and succeeding years. He also found here several undescribed plants, as well as a number of entomological novelties. My own first journey was in January, 1880. In later years the place has been visited by most of the California botanists, and by some from the east, and numerous additions to its known flora have resulted from their collections.

In early reports Palm Springs appears under its Spanish name of Agua Caliente, and usually it was erroneously located in San Bernardino county. In reality it then belonged to San Diego county, but now is included within the boundaries of Riverside county.

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Having revisited Palm Springs in April of the present year (1907), and in the company of my friend Mr. Wright, it has occurred to me that a few notes on some of the plants seen there might not be without interest.

The first thing to attract the attention of the botanist, as he wanders amidst the distinctively desert vegetation, is the occasional sight of a plant from the cismontane flora, beyond the San Gorgonio pass. There are a few plants, of which *Salvia Columbariae* and *Stylocline gnaphalioides* are the most abundant, that seem equally at home on either side of the mountains, so that it is only by a consideration of their entire range that their true position can be determined. But those to which I refer are evident strays, of which only a few, or even but a single specimen may be found. Such plants as *Phacelia Whitlavia*, *Lupinus densiflorus*, *Hosackia maritima* or *Mimulus exilis*, seem strangely out of place in the society of their desert kindred. Even the costal flora of San Diego finds representation in an occasional plant of *Jepsonia Parryi*, or of *Adiantum emarginatum*.

The mesa supports an abundant growth of *Sphaerostigma pallida*, a species recently segregated by Mr. Abrams from *S. bistorta*. Here also is found the beautiful and fragrant *Abronia aurita*, separated by the same author from *A. villosa*. Both of these segregates represent cismontane species, modified by a difference of environment. With them, and as plentiful, grows *Coldenia Palmeri*. a typical desert plant. In a former paper (Erythea **6**: 91) I stated that this species grows from a running root, but the careful excavation of numerous individuals proves this to be an error. It is really from a deep-seated perpendicular root, from which spread out numerous slender wiry stems, having the appearance of roots, and it is these which are seen in herbarium specimens. *C. brevicalyx* has a stouter perpendicular root, which branches at the surface. We failed to rediscover the latter species, although a careful examination was made of the wash of Chino creek, where Mr. Wright found the specimen which became the type, in part, of the species. But

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in 1905, Mr. H. M. Hall collected it in McCoy's Wash, considerably further east in the desert. Palm Springs is probably the western limit of its distribution.

Plantago scariosa is very common on mesas and hillsides, and with it often grows the closely allied *P. erecta*, the common species, in similar places, in the cismontane region. Immediately west of the warm springs, Mr. Wright collected, years ago, the type specimens of *Gilia maculata*, from which alone the species was known. To our disappointment the most careful search was unrewarded by a single specimen, perhaps because much of the spring vegetation was already dried up. Great then was my gratification, shortly after my return home, at finding among some desert plants, sent me for identification, specimens of this rare little Gilia, marked "very abundant." They were collected by Mrs. Charlotte M. Wilder, a botanist whose keen powers of observatian have led to many fortunate discoveries. She had gotten it on the sands of the Whitewater, about half way between the station of that name and Palm Springs.

A most interesting locality is Tauquitz canyon, as it is now called, but which was formerly known as West canyon. It is a deep cleft in the scorched hills west of the village. Over the great blocks of stone which fill its narrow floor, pours down the stream of cold water which supplies the needs of the villagers. At a distance of little over a mile from its mouth, further exploration is prohibited by the closing in of its precipitous walls, over which the water drops in a charming cascade. It is filled with a luxuriant growth of characteristic desert plants, shrubs, and herbs both annual and perennial, and its short distance is the type station for seven species.

Brandegea parviflora, the first to be described, is no longer to be found here, but several botanists have recently obtained it in places farther east in the desert. Here Mr. Wright collected the specimens on which *Micrampelis leptocarpa* was founded. Field study at the type station convinced us that it was a leaf

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form of *Echinocystis macrocarpa** which grows here in typical form, as also others with the leaf characters assigned to *M. leptocarpa* more or less developed, so that the two clearly run together. No distinctions could be found in the flower, or in the fruit, which is six seeded.

Another of Mr. Wright's discoveries in this canyon was *Mirabilis tenuiloba*, an excellent species, well characterized by the long, narrow lobes of the involucel. The whole plant is clammy-viscid; the flowers are white, and more campanulate than those of *M. Californica.* It grows mostly in large compact clumps, but sometimes it is straggling, and supports itself on shrubs. On the western side of the canyon, where most exposed to the sun, the plants were loaded with ripe seed, but on the shaded eastern bank they were yet in full flower. Both this species and *M. aspera* are more tolerant of exposure to the sun than is *M. californica. M. aspera* is very common in both the Mojave and the Colorado deserts, and where it grows far out in those arid regions it is very distinct, having much the habit of *M. tenuiloba*, although more commonly straggliug in its growth, the foliage rough, only the inflorescing tips of the stems viscidulous, and the flowers small and white. On the confines intermediate forms appear, with less roughened foliage and larger purplish flowers, which connect it too closely with *M. californica*, of which it may be regarded as a subspecies.†

This canyon is also the type locality for several species characterized from specimens collected by the present writer. Of these *Delphinium Parishii*, a plant with loosely flowered spikes of light blue flowers, is quite common on the hills in this part of the desert. On the margin of the stream was collected the type specimen of *Eleocharis Parishii*, and there also grew the tussock of robust sedge that furnished the material on

Echinocystis macrocarpa* forma **leptocarpa. *Micrampelis leptocarpa* Greene, Pittonia **2**: 282. 1892.

†*Mirabilis californica* Gray, subsp. **aspera** n. comb. *M. aspera* Greene' Erythea **4**: 67. 1896.

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which *Carex vitrea* was founded, the only Carex known to reach even the borders of the desert. *Selaginella Parishii* completes the list of these type plants. It is common, growing about stones, and in rock crevices, often in company with *S. Bigelovii*, the cismontane species. They are readily distinguishable by their gross characters; the creeping and rooting stems of the first species are flattened, while the stems of the second are quadrangular and erect.

There are other interesting canyons, Chino, Andreas and Murray, in each of which grow plants not found in any of the others. Our limited time, however, permitted us to visit only Palm canyon, at the extreme head of the valley.

Just before entering it the road passes through a sandy wash, in which were growing many plants of *Mimulus Bigelovii*. On the right, in rough stony ground, grew *Salvia Vaseyi*,* only a single shrub showing a few early flowers. This is by no means a rare plant in the Colorado desert, but it has seldom been collected, as its season of flowering is later than that usually chosen by botanists for their desert explorations. From the cliff on the left hung masses of *Philabertia hirtella*,† certainly a distinct species.

The canyon takes its name from the fine grove of fan palms which fill it for a mile or more, crowding the narrow stream bed, and straggling up the rugged sides. Few plants of interest were found here, the best being a few robust clumps of *Juncus Cooperi*, growing along the edge of the stream. The stems are

*Salvia Vaseyi (Porter) *Audibertia Vaseyi* Porter, Bot. Gaz. 6: 207. *Ramona Vaseyi* (Porter) Briquet in Engler & Prantl, Natpfl. 4: 287; and independently by Heller, Muhlenbergia 1: 59.

†Philabertia hirtella (Gray) *P. heterophylla* var. *hirtella* Gray, Syn. Fl. 2: Part 1, 88. *Philabertella hirtella* Vail, Bull. Torr. Club 24: 309. Climbing over shrubs, or pendant from rocks; the whole plant gray, with a fine cinerous pubescence; stems slender and twining, 2-3 m. long; leaves in pairs, distant, linear, 3-4 cm. long, the petiole short, or the upper leaves sessile; peduncles 1-2.5 cm. long, and pedicels 6-15 mm. long, each subtended by a short, linear bractlet; flowers 6-15, greenish-white; follicles in divergent pairs, long-beaked, and at least 5 cm. long.

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very stiff, and about a meter in height. *Hosackia rigida* was in ripe fruit. The pods are brown, glabrous and shining, 2.5-3.5 cm. long; seeds 15 or more, short-oblong, 2. mm long.

A day was devoted to the exploration of the precipitous cliffs which form the eastern barrier of the valley. Here, in the dryest and barrenest of soils, were growing many characteristic desert plants, in fine condition—*Hoffmanseggia microphylla*, *Mentzelia involucrata*, *Mohavea viscida*, *Chaenactis carphoclinia*, and others. In places the ground was brightened with the daisy-like *Eremiastrum bellioides*. But most interesting was *Langloisia setosissima*, growing on the talus of the cliffs. The plants were 3-5 cm. tall, stiffly erect, the stems simple, or few-branched, the flowers of a clear bright blue, borne in terminal flat-topped clusters. It is quite distinct from *L. punctata* of the Mojave desert.

The return across the valley afforded a good opportunity for observing the arboreal flora. The most abundant tree is *Dalea spinosa*, growing, for the most part in small groves, on the coarser soils of the mesas. The slender, spinescent branchlets are densely matted, and the whole tree has a dingy appearance, due to the gray-green color of the bark. Only the closest inspection detects a few insignificant pinnate leaves. But in June it is said to clothe itself with a mantle of rich purple blossoms.

The desert willow affects dry water-courses, and while it has graceful foliage and showy flowers, its habit is usually straggling and ungainly. An occasional well-shaped specimen demonstrates its possibilities.

The handsomest as well as the largest tree of the valley is *Parkinsonia Torreyana*. A noble specimen in the edge of the village has a spread of branches of 16 m., and its whole top was a dome of golden yellow blossoms.

An interesting tree, growing in canyons, is *Condalia Parryi*. Usually of rough habit, and often little better than a shrub, it sometimes attains a height of over 5 m. and a presentable outline. The finest specimens are to be found in Snow Creek can-

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yon, some miles to the west. Its broad, thin leaves are bright green, presenting an agreeable contrast to the somber and cramped desert vegetation. The trees were well loaded with plum-like fruit, nearly ripe. The drupes are pulpless, with a hard, thick putamen; there is no albumen, and the cotyledons are thin, foliaceous and green. It is a structure well adapted to protect the seed from the attacks of rodents, who would learn how slender was the reward for gnawing thro the hard shell; but it must be difficult for such a seed to germinate under the arid conditions of its habitat.

If trees are few, both in numbers and in species, shrubs are numerous and multifarious. *Dalea californica* and *D. Schottii* hung out their purple racemes, and the entangled branches of the misnamed *Krameria parviflora* were almost hidden with flowers of a darker shade of the same color. *Beloperone californica* was loaded with its blossoms of dull red, a color seldom displayed by the plants of the desert. The ill-smelling *Isomeris arborea* was well set with fruit. There is a considerable difference in the pods of this shrub. That which is usually considered as typical, and which is abundant on both the Colorado and Mojave desert, has an inflated oblong fruit, acute at the apex. The variety *globosa*, which I have never found in the desert, but which is common on the sea coast of San Diego county, has an inflated globose fruit. A third form, occasionally seen about Palm Springs and Whitewater, has a narrow uninflated fruit, and may be called var. *angustata*.*

As everywhere in the desert, at similar altitudes, the Larrea bushes were a marked feature of the landscape. Many other rugged shrubs, including several species of *Opuntia*, contributed to its rough and forbidding aspect. About them the desert winds had heaped fine sand, in which often they were half buried; and growing in this were to be found *Dithyrea californica*, several species of Oenothera, and other annuals. So far indeed is the desert from being a vegetationless waste, that few are the spots so dry, so barren, that there some plant does not manage to exist.

Isomeris arborea* Nutt. var. **angustata. Fruit narrowly oblong, 4 cm. long, 5 mm. thick, 3-5-seeded, uninflated and conformed to the seed.

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THE RIVERSIDE BOTANICAL CLUB

The Riverside Botanical Club met on Friday evening, October 18th, in the botanical laboratory of the High School to discuss and prepare a program of work for the Club season of 1907-'08. As it had already been decided to spend the season in the study of the local genera and species of Composites, it only remained to apportion the work among the members, and decide on the best way to make the programs as practical and instructive as possible. It was decided to follow the sequence of genera used by Abrams in his "Flora of Los Angeles and Vicinity." Each member will be responsible for a genus in turn, and may get as much help as he or she may see fit; and in discussing the characteristics of the genus before the Club use the black-board or chart or any other available method of presentation, with the object of making the principal characters of each genus so thoroughly understood that all may be helped in recognizing it whenever it is found.

Mrs. Wilder was appointed to prepare a report on the international rules of nomenclature.

This Club was organized in July, 1903, and has been working along with a small but steady membership, and has been successful in bringing the local botanists together for study and the mutual friendliness that springs up among people who are interested in the same lines of work and study. The meetings are largely informal, there are no financial obligations, no attempt is made to make the meetings "popular" or "entertaining" except to those actually interested. We meet on the Friday evening nearest the full moon for the benefit of members from out of town, from October to June of each year.

FRED. M. REED, *Secretary.*

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THE DEER OAK

By Willis L. Jepson

The deer oak (*Quercus Sadleriana* R. Br. Campst.) has an exceedingly limited range, being found only on the high mountain slopes of northwestern California and adjacent Oregon. If its range be extended it must be looked for in the Oregon coast region northward, for it is not at present known to the north of Curry county. Although so restricted in distribution it is remarkably abundant in the Marble Mountain country, on the Klamath Range east of Crescent City, and in the Siskiyous, at elevations of 4000 to 9000 feet. On the trail from Cudahay valley to Cottage Grove I passed, in the summer of 1907, through several miles of it where it monopolized the ridge to the exclusion of all other shrubs. It is equally abundant in many places on both slopes of the Klamath Range. I noticed that the mules of the pack train ate it greedily, preferring it to other chaparral and refusing Brewer oak.

It grows 1 to 12 feet high, at the higher altitudes with the stems at base hugging the ground down hill, showing the effects of winter snow. While it is most abundant on open chaparral slopes, it is also markedly shade tolerent and is common in the white fir forests. The Klamath Range has long been periodically fire-stricken, but this condition has been no disadvantage to this oak in competition with other plants as it stump sprouts readily.

It flowers in July. The variation in the number of stamens is unusual, even for an oak. On Trinity Summit, Humboldt county, I made, in 1902, a count of 21 flowers in the field with the following results:

4	flowers	had	5	stamens
1	"	"	6	"
4	"	"	7	"
1	"	"	8	"
4	"	"	9	"

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2 flowers had 10 stamens
3 " " 12 "
1 " " 14 "
1 " " 17 "

The acorns, which have a kernel sweet and palatable even to the white man, are eaten by deer aad bear, whence the folk names "deer oak" and "bear oak."

Notes on California Plants

In the first number of this volume Mr. Parish calls attention to the reported occurrence of *Quercus Morehus* Kellogg, on Catalina Island, doubting its presence there on account of the absence of both of its parents. Undoubtedly he is right. I feel sure that it is a mistaken identification, and the species reported should have been *Quercus Macdonaldi* Greene. This somewhat resembles the arboreal forms of *Q. Morehus*, but is more nearly related to *Q. lobata* or *Q. Douglasii*, being deciduous. Professor Sargent regards it as a form of the evergreen *Q. dumosa*.

Layia carnosa T. & G. (*Madaraglossa carnosa* Nutt.) is reported as occurring from San Diego to Marin county. It is quite plentiful on the sands at Samoa, near Eureka, Humboldt county.

Helianthella Cannonae Eastw. This species, when described, was known only from the San Francisco peninsula. Recently I found it on the Berkely hills east of Grizzly Peak, growing amid the chaparral. Mrs. Brandegee tells me that she has seen it near Laundry Farm, at the foot of Redwood Peak, but has regarded it as a hybrid between *Wyethia* and *Helianthella*. In no locality where I have seen it is there either of the supposed parents except *Wyethia*.

Alice Eastwood.

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COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

CLAYTONIA PERFOLIATA Donn, Ind. Hort. Cantab. 25. 1796. Willd. Sp. Pl. **1**: 1186. 1798.

C. foliis enerviis, radicalibus rhombeo-ovatis, caulinis subconnatis, floribus umbellato-verticillatis, petalis integris. W.

Claytonia perfoliata Donn. ind. hort. cantab. p. 25.

Durchwachsene Claytonie. W.

Habitat in America boreali. Annual. (v. v.)

Folia radicalia petiolata rhombeo-ovata enervia, subcarnosa, scapus erectus quadri f. quinqueuncialis, foliis caulinis duobus oppositis, vel oblique rhombeo-ovatis basi attenuatis cohaerentibus, vel ovatis uno latere connatis, altero emarginatis. Flores bini vel tres in medio scapi supra par foliorum indicatum pedunculati folio unico parvo oblongo suffulti. Flores denique sex vel octo umbellati in apice scapi pedunculati absque bracteata. Petala alba integra. W.

Differt a C. sibirica, cui similis; floribus albis duplo minoribus, petalis integris, inflorescentia, foliis enerviis, caulinis subconnatis, et radicalibus rhombeo-ovatis. W.

The above description is copied from Willdenow, and both Britton in the Illustrated Flora, and Piper in the Flora of Washington, cite it as the original one. If the name in Ind. Hort. Cantab. is without description, or if a description is given there and differs from that of Willdenow, I should consider it a great favor to have the facts communicated to me. According to the description, the plant we have commonly called *Claytonia perfoliata*, then *Montia perfoliata*, and now *Limnia perfoliata*, is probably some other species.

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THE GENUS CHLOROPYRON

By A. A. Heller

In Proc. Cal. Acad. **1**: 61. 1855, Dr. H. H. Behr published the genus *Chloropyron*, based upon *C. palustre*, a plant of the salt marshes about San Francisco. Up to 1885 the plant was unknown to eastern botanists, being placed as a synonym of *Orthocarpus floribundus* in the Synoptical Flora, issued in 1878. In 1885, in Bull Cal. Acad. **1**: 128-151, Mrs. Curran published a list of the species named by Drs. Kellogg and Behr, and Mr. Bolander. The true status of this plant was then made known —that it is the same as *Cordylanthus maritimus* Nutt.

In June, 1902, I chanced upon it for the first time in the marshes back of Tiburon. My first thought was that it might be an *Orthocarpus* or perhaps a *Castilleja*. And I still think as I did then, that it could be equally as well placed in either of these genera as in the one where it now rests. Or, in other words, that it is out of place in any of them. Accordingly, Dr. Behr's generic name may again be brought into use, and the related species transferred to it. *Cordylanthus* or *Adenostegia Kingii*, although placed in the same section with the *Chloropyron* species, does not have the same habit, and is not here included. The species are as follows:

Chloropyron maritimum (Nutt.)

Cordylanthus maritimus Nutt.; Benth. in DC. Prodr. **10**: 598. 1846.

Chloropyron palustre Behr, Proc. Cal. Acad. **1**: 61. 1855.

Adenostegia maritima Greene, Pittonia **2**: 181. 1891.

A coast species, ranging from San Diego north to Humboldt county, and strangely enough, reported from San Bernardino county, at a considerable distance from the coast. The type of the genus, and quite fittingly so, it being the first published species.

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Chloropyron canescens (Gray)

Cordylanthus canescens Gray, Proc. Am. Acad. **7**: 383. 1868.

Adenostegia canescens Greene, Pittonia **2**: 181. 1891.

A species of the Great Basin, ranging from eastern California to Salt Lake, Utah, in saline soil.

Chloropyron Parryi (Wats.)

Cordylanthus Parryi Wats. Am. Nat. **9**: 346. 1875.

Adenostegia Parryi Greene, Pittonia **2**: 181. 1891.

This is also a Great Basin plant, known only from southwestern Utah.

Chloropyron molle (Gray)

Cordylanthus mollis Gray, Proc. Am. Acad. **7**: 384. 1868.

Adenostegia mollis Greene, Pittonia **2**: 181. 1891.

A local species, known only from the marshes at the mouth of the Sacramento about Vallejo, Benicia and Suisun. It differs from the other species in having two instead of four stamens, but the habit and general appearance of the plant is the same.

A significant fact is that all the *Chloropyron* species are found in salt marshes near the coast or in saline soil in the interior. All of the *Adenostegia* species inhabit the hill country, commonly in gravelly soil.

A New Name

Carduus longissimus

Carduus Americanus Rydb. Bull. Torr. Club, **28**: 508. 1901; not *Carduus Americanus* Greene, Proc. Phila. Acad. **1892**: 362. 1893.

Although discarding names raised to specific rank by other writers in cases where they conflict with later imposed specific names, Dr. Rydberg, in the Flora of Colorado, neglected to dispossess his own names. I therefore assign the above name to this plant, referring to the long stout spines which terminate the involucral bracts.

A. A. Heller.

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EDITORIAL

It is a pleasure to bring to notice the Riverside Botanical Club, composed of a band of earnest botanical workers located in southern California in the midst of orange and lemon groves. The fact that only a few years ago this now beautiful and productive spot was little more than a desert, shows what enterprise and perseverence can do. That this same spirit of progress also enters into their botanical life is very evident. Would that we had more of it in this land of unexcelled botanical opportunity, but with so few active workers! We hope to hear very often of the doings of the Riverside Botanical Club.

Sad to say, we owe our readers an apology, and shall hasten to make it with due humility. At the bottom of page 120 the statement is made that it is "the one weak spot in an otherwise admirable code." Unfortunately, that "one weak spot" was not accurately measured. It should have been enlarged considerably. The very day the last number was mailed we read Professor L. M. Underwood's paper in the October *Torreya* on "The Names of some of our native Ferns," and there discovered that the American code does not recognize the priority right of the varietal name, but that in all cases the varietal name must give way to the specific name, no matter how much older the former may be, or how clear its identity. The number of the *Bulletin of the Torrey Botanical Club* in which the revised American code is printed is not now at hand, but we examined it some time ago with special reference to the status of varieties, and are of the impression that the wording is the same as that of Canon 9 (c), printed in the May, 1904 number. Unless we are very obtuse, there is nothing in the wording of that paragraph indicating that a specific name *always* has precedence over a varietal one, but *only* in the case of similar names in the same genus. The former is not a just interpretation, and is at variance with the principle of priority. The editor has nothing to lose either way, for he does not describe varieties and never expects to, but

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he does not believe in the principle of advocating priority and then deliberately making exceptions. However, since the Germans at Vienna decided against the validity of varietal names, and the Americans have apparently done likewise, with this parting protest he is going to join the ranks of the majority. But he is going to try to keep within the confines of the law, and incidentally will stretch out his hand and point out the way back to the straight and narrow path of rectitude to any erring brother who may stray therefrom.

In the October number of the current volume of the *Botanical Gazette* Miss Mary A. Day has a timely article on "Some Perplexities of the Indexer." In summing up, the following recommendations are made: "(1) Indicating clearly each new species, combination, or name; (2) not allowing a name to appear as new when it has been published previously; (3) always giving the correct authority, or, where the parenthesis is used, the correct double authority; (4) stating clearly the category to which each name, below the specific, belongs; and (5) in no way distorting or altering the rank of names attributed to other authors." It is very important that all new names be plainly indicated. The printing of all new names in black type is an easy matter, and should become a uniform practice. It is quite generally understood that the absence of an author's name after a name in parentheses indicates the writer of the paper as the author of a new combination, yet one sometimes finds instances of this usage when no publication of a combination is intended. And by all means let us have full citations, instead of the slipshod manner, entirely to common, of making new combinations by merely giving the old name in parentheses and nothing else. In manuals and floras, a very simple and satisfactory way is to list at the end of the volume all new names published in the work, and the pages on which they occur. This has been done in Small's Flora of the Southeastern United States," and in Mackenzie's "Flora of Jackson County, Missouri."

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Volume 3 January, 1908 Number 9

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor
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Volume 3 No. 9

MUHLENBERGIA

A. A. HELLER, Editor

LOS GATOS, CALIFORNIA, JANUARY 16, 1908

NEW PLANTS FROM THE GREAT BASIN

BY AVEN NELSON AND P. B. KENNEDY

The writers have continued, as time would permit, their studies of the flora of Nevada and adjacent territory. Much that is of interest always develops in the study of any considerable collection, but this is particularly true when the collection comes from our vast, and, to a large extent, yet unexplored arid or semi-arid west. Years must probably elapse, and collection upon collection be amassed, before we shall be able to understand this flora that so strikingly bears the marks of its environment. If these notes and descriptions contribute even a mite to its fuller understanding, the mission of this little paper will have been fulfilled.

Erythronium multiscapoidea (Kellogg) n. comb.

Fritillaria multiscapoidea Kellogg, Proc. Cal. Acad. **1**: 46. 1855.

Erythronium grandiflorum var. *multiflorum* Torr. Pac. R. Rep. **4**: 146. 1857.

Erythronium purpurascens Wats. Proc. Am. Acad. **12**: 277. 1877.

This plant has no doubt been secured a number of times, but mention may be made of a recent collection of it by Mr. C. G. Gulling, near Quincy, Plumas county, Calif., March, 1905.

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Oligomeris ruderalis (Nutt.) n. comb.

The genus *Oligomeris* has thus far but five species assigned to it. In Torr. and Gray, Fl. N. A. **1**: 125, there was published as a new genus and new species *Ellimia ruderalis*, based on a manuscript by Nuttall. This plant was by DeCandolle (Prodr. **16**: 587) referred to *Oligomeris subulata* (*O. glaucescens* Camb.). Since that time Nuttall's species has been allowed to rest in synonymy. Admitting that Nuttall's genus is a homonym, there seems to have been good reasons why the species should not have been rejected.

Four of the five species belong to South Africa. The other, *O. glaucescens* Camb., is said to extend from the Canary Islands to India, and also "seemingly indigenous in North America." Aside from the extreme improbability of such a range as that, one may note that the capsule of Nuttall's plants, while 4-lobed like the other, is distinctly bilobed as to each of the main lobes, and that the seeds are materially larger. No doubt other characters equally good could be found were material of both species at hand.

Frequent on dry gravelly mesas at Moapa, Lincoln county, Nevada, May 12, 1905 (1129) P. B. Kennedy.

Lepidium albiflorum n. sp.

A low, much branched biennial, with small white flowers, deeply toothed pinnatifid leaves, and a long tap root. Stems, leaves and pedicels minutely and finely pubescent: leaf segments irregularly distributed and variable in size, sometimes a verticel of dried up petioles from the previous year's growth surrounding the base: flowers pure white: petals oblanceolate, 3.5 mm. long and less than 2 mm. wide, prominently veined: calyx segments ovate, minutely pubescent, apex and margins scarious, 2 mm. long and 1 mm. wide: filaments broad, about 2 mm. long: mature capsule from glabrous to finely pubescent, sub-orbicular, 2.5 mm. long and about as wide, bifid at apex, finely reticulated: style prolonged beyond the capsule .5 mm. to 1 mm.: seeds 1.3

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mm. long and barely 1 mm. wide, very finely striate-tuberculate.

Intermediate between *L. alyssoides* Gray, and *L. montanum* Nutt. The type was collected in somewhat saline soil on wild pasture land in Spanish Springs valley, Washoe county, Nevada, May, 1906, by C. L. Brown (No. 66). What appears to be the same are two sheets collected by F. H. Hillman in 1894.

Krameria Grayi n. n.

K. canescens Gray, Pl. Wright. **1**: 42; not *K. canescens* Willd. ex Schult. Mant. **3**: 303, which properly belongs to a Peruvian species.

Excellent specimens of this species were secured at Moapa, Lincoln county, Nevada, by P. B. Kennedy, May 12, 1905, No. 1095.

Emplectocladus Andersonii (Gray) n. comb.

Prunus Andersonii Gray, Proc. Am. Acad. **7**: 337. 1868.

Amygdalus Andersonii Greene, Fl. Fran. 49. 1891.

In Pl. Frem. 10. *pl. 5*, Torrey established the genus and species *Emplectocladus fasciculatus*. This species was later referred to other genera, but why so strongly marked a genus should have been relegated to synonymy is not clear. Attention is therefore called to it again, and the above species transferred to it.

Boisduvalia sparsifolia n. sp.

Plant 3 to 6 dm. high, erect, simple or with ascending branches above: stems slender, yellowish below, gray-green above: stems and leaves covered with soft villous hairs: leaves few, about 2.5 to 3 cm. long and 2 to 4 mm. wide, linear-lanceolate, acute, margins undulate, entire or very sparingly dentate; the leaves subtending the flowers broadly ovate, apex abruptly acuminate, entire: spike elongated: flowers pink, purple when dry, 5 mm. long: corolla exceeding the 3 mm. long calyx lobes about half, its lobes about 3 mm. long, bifid about one-half their

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length: style 3 mm. long: mature capsule 6 mm. long, densely covered with long hairs, abruptly attenuate at apex, 8-nerved: seeds concave on the inner surface, about 1 mm. long, glabrous, slightly narrowed at one end.

Allied to *B. densiflora*, but about one-half the size in all its parts with a few linear-lanceolate leaves below, and only broadly ovate leaves above subtending the flowers.

The type is deposited with the Nevada Agricultural Experiment Station herbarium, and was collected at Maggie Creek, Elko county, Nevada (No. 644) P. B. Kennedy, August 13, 1902.

Chylisma venosa n. sp.

Annual or biennial, with a stout tap root: plant villous-hirsute, becoming glabrous towards the inflorescence, 4 to 8 dm. high: leaves mostly produced from or near the base, 1 to 2 dm. long, unequally and irregularly pinnate, terminal segment orbicular-ovate, many times the size of the lower segments, light gray (canescent) above and prominently brown-veined and short hirsute below, segments irregularly serrate or lacerate-toothed: calyx tube narrowly obconical, 2.5 mm. long, calyx lobes lanceolate, 7 mm. long and 2 mm. wide: petals yellow, becoming purple, orbicular-obovate, about 8 mm. long and 6 mm. wide: style about 7 mm. long, hairy at base; stigma globose: anthers versatile, 4 mm. long, as long as the yellow filaments: capsule almost glabrous, 20 mm. long, gradually tapering to a pedicel 8 mm. long; seeds ovate-acuminate, 1 mm. long.

Allied to *C. multijuga*, but the plant is villous-hirsute and the leaflets very unequal, with the terminal leaflet obtuse and very much larger than the lateral ones.

The type was collected on sandy washes and canyons in Muddy valley, Lincoln county, Nevada, on May 16, 1906, by P. B. Kennedy and L. N. Goodding, (No. 64).

No. 5188 collected by Marcus E. Jones at La Verken, Utah, on May 7, 1894, is the same, but with slightly larger flowers.

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As indicated above, this plant cannot be the *Oenothera multijuga* of Watson (Proc. Am. Acad. 8: 595) if any reliance be placed upon that description. The description, was, however, drawn from a fragment, and might properly apply to any one of several species. For this reason it seems well to present this description, and under a new name, so long as Watson's plant remains unrecognized.

Oreocarya Eastwoodae n. sp.

Plant 1 to 2 dm. high, perennial: stems several, erect, pubescent and setose-hispid: leaves closely clustered at base of stems, densely silvery canescent (the younger ones hirsute), linear-lanceolate to somewhat spatulate, 3 to 5 cm. long including the petioles: sepals 6 mm. long in flower and 8 mm. long in fruit, exceeding the nutlets 3 to 4 mm. in mature fruit, hirsute and hispid without: corolla yellowish, its exserted tube 9 mm. long, its lobes orbicular, 4.5 mm. long and 4 mm. wide, appendages conspicuous: style 5 mm. long: anthers 2 mm. long and .5 mm. wide: nutlets 4, close fitting, ovoid, 2.5 mm. long and 2 mm. wide, finely muricate and transversely rugose.

Allied to *O. longiflora*. The specimens taken as the type were collected on the higher slopes of the Mormon mountains, Lincoln county, Nevada, at an elevation of from 3000-6000 feet, by P. B. Kennedy and L. N. Goodding, No. 146, July, 1906. Other specimens to be referred here are from Court House Wash, southeastern Utah (no number), Alice Eastwood; Juab, Utah, No. 1074, L. N. Goodding.

Phlox Gooddingii n. sp.

Perennial, glandular pubescent, loosely tufted, suffrutescent, the previous year's growth persisting on the short densely branched prostrate stems; new annual growth 3 to 5 cm. in length, terminating in from one to several flowers: leaves verticillate, usually two long and three short ones in a whorl, long ones 15 mm. long and 2 mm. wide, short ones 7 mm. long and 1 mm. wide, linear-lanceolate, acerose, a few scattered pairs

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broadly elliptical, slightly revolute: flowers white to pink or pale purple: calyx 7 mm. long, teeth acerose, joined at the base only by a thin membrane: corolla tube 10 mm. long, glandular pubescent; corolla lobes glabrous, suborbicular, 7 mm. long and 6 mm. wide, slightly and unevenly sinuate: anthers 2.5 cm. long: style short, about 3 mm. long.

In general appearance somewhat like *P. Stansburyi brevifolia*, but its short style brings it near to *P. Douglasii*, *P. andicola* and *P. Kelseyi* from which it is easily separated.

The specimens taken as the type were collected on the north slopes of the Mormon mountains, Lincoln county, Nevada, by P. B. Kennedy and L. N. Goodding, no. 103. This species prevailed on the north slopes, while another *Phlox*, perhaps referable to *P. Douglasii*, was abundant on the south slopes.

Types deposited in the Nevada Agricultural Experiment Station herbarium, and in the Rocky Mountain Herbarium.

Hydrophyllum alpestre n. n.

H. capitatum var. *alpinum* Wats. Bot, King Rep. 249. 1871.

Abundant in the vicinity of Reno. There is positively nothing to indicate that it runs into *H. capitatum*.

It has been so well diagnosed by Watson in the place cited above, and by Gray in Syn. Fl. **2**: 154, that it seems superfluous to recharacterize it. The name *alpinum* is preoccupied in this genus.

Plantago Gooddingii n. sp.

Annual, subcaulescent, erect, 1 to 2 dm. high, leaves, peduncles and spikes rather densely lanate canescent: leaves linear-lanceolate, acuminate, 4 to 5 cm. long, 6 to 8 mm. wide, about half as long as the peduncles: spikes dense, 1 to 2.5 cm. long: bract oval, acute, 3 mm. long and 2 mm. broad, scarious, with a thick green midrib, equalling and closely resembling the calyx lobes, somewhat ciliate-lanate: calyx lobes glabrous, not otherwise distinguishable from the bract if separated: corolla lobes white, strongly reflexed, ovate-acuminate, about equalling the

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tube which is scarcely shorter than the calyx: pyxis ovoid, longer than the style, barely exceeding the calyx, circumcissile at the lower fourth: seeds two, brown, smooth, slightly winged.

This species may at times have been referred to *P. patagonica*, but Morris in his discriminating paper (Bull. Torr. Club **27**: 105) on that species and its allies has made it clear that *P. patagonica* is not indigenous within the limits of the United States. Using his key, the present species is nearest to *P. fastigiata*, from which it is amply distinct.

Collected by L. N. Goodding at Rioville, Nevada, May 6, 1902, No. 808a; and by P. B. Kennedy at Moapa, Lincoln county, May 12, 1905, No. 1070.

Symphoricarpos fragrans n. sp.

A handsome, small leaved shrub with very slender, delightfully fragrant pink flowers: leaves oval, from 5 to 10 mm. long and 3 mm. wide, glabrous to minutely hirsute pubescent: calyx 3 mm. long, hirsute, irregularly notched into minute lobes: corolla 9 to 10 mm. long, tube 8 mm. long, lobes 2 mm. long, suborbicular: style 3.5 mm. long with a very few scattered hairs: anthers about 2 mm. long and 5 mm. wide, subsessile, included in the throat.

Collected in a single locality in a rocky canyon at Truckee Pass, Virginia mountains, Washoe county, Nevada, where it is abundant. The type is No. 1313 P. B. Kennedy, June 14, 1906.

Plainly a northern ally of *S. longiflorus*, from which it differs in the size of its leaves, and the size, character and color of the flowers.

A new Combination

Sabina megalocarpa (Sudw.)

Juniperus megalocarpa Sudw. Forestry and Irrigation 307. Je. 1907.

New Mexico. A tree, similar to *S. monosperma*, but with very large glaucous 1 or 2 seeded fruits.

T. D. A. Cockerell.

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NORTHERNMOST STATIONS FOR TWO COMMON CALIFORNIAN TREES

By Willis Linn Jepson

The western plane and the Fremont cottonwood are commonly spoken of as ranging from the lower Sacramento river southward into Lower California. No definite northernmost stations have ever been assigned either. I have seen the plane along the Feather river and on the Sacramento river above its junction with the Feather. The most northerly locality appears to be on the upper Sacramento at Battle Creek, Shasta county, according to Mr. Benjamin Macomber, Principal of the Redding High School, who writes me that it is also said to be near Anderson, five miles north of Battle Creek.

The Fremont or common cottonwood is very common in the upper Sacramento valley, and occurs as far north as Redding. I have seen splendid individuals on Cottonwood creek, Tehama county.

The Name of the White Sage

The white sage of California was first published as *Audibertia polystachya* Bentham, but the genus *Audibertia* is now generally regarded, and with good reason, as congeneric with *Salvia*. In transferring this species to *Salvia* I called it *Salvia Californica*, the specific name *polystachya* being preoccupied. It has now been called to my attention that there is an earlier *Salvia Californica*. The name will therefore be:

Salvia apiana

Salvia Californica Jepson, Fl. W. Mid. Calif. 460. 1901; not *Salvia Californica* Brandegee, Proc. Cal. Acad. II. 2: 697. 1889.

Audibertia polystachya Bentham, Lab. 314. 1833.

Ramona polystachya Greene, Pittonia 2: 235. 1892.

Willis Linn Jepson.

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NORTH AMERICAN CASTALIA

By T. D. A. Cockerell

(1) Subgenus *Brachyceras* Caspary.

(1) Castalia elegans (Hook.) Greene

(2) Castalia ampla Salisb. 1806.

(2) Subgenus *Castalia* DC.

(a) Section *Xanthantha* Caspary.

(3) Castalia flava (Leitner) Greene

Rose gives good reasons for separating this from *Mexicana*.

(b) Section *Chamaenymphaea* Planchon

(4) **Castalia tetragona leibergii** (Morong)

Castalia Leibergii Morong, Bot. Gaz. **13**: 134. 1888.

Conard says "the American plant, from its small number of stamens and their insertion below the summit of the torus, may deserve the rank of a variety." Stamens about 40 in the European, 12 to 16 in the American plant.

(c) Section *Eucastalia* Planchon.

(5) Castalia odorata (Aiton) Woodville & Wood

(5a) **Castalia odorata minor** (Sims)

Nymphaea odorata var. *minor* Sims, Bot. Mag. *pl. 1652*. 1814.

"The commonest form in New Jersey."

(5b) Castalia odorata rosea (Pursh) Britton

(6) **Castalia spiralis** (Raf.)

Nymphaea spiralis Raf. Med. Fl. **2**: 45. 1830.

Nymphaea reniformis Walt. Fl. Car. 155. 1788.?

Conard shows that Walter's diagnosis cannot wholly apply to this plant, and no specimens exhist in the Walter herbarium. "Loculis monospermis" applies to *Nelumbo*, and Rafinesque so understood it. Conard calls this plant *N. odorata gigantea* Tricker, 1897, but cites much earlier names.

(7) Castalia tuberosa (Paine) Greene

Boulder, Colorado.

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THE GENUS NAIOCRENE

By A. A. Heller

Ten or eleven years ago when I first saw herbarium specimens of *Montia fontana*, the then recent transfer of some of the *Claytonia* species to *Montia* did not seem to me to be the proper course. A short time before seeing the *Montia*, I had printed, not published, in my list of Idaho plants of 1896, a combination which I had intended to publish under *Montia*. This doubt concerning the relationship of the plants deterred me from so publishing until an opportunity could be had to properly study the subject. Meanwhile, some of our most conservative botanists adopted these new Montias, and so the matter rested.

Recently in Mem. Nat. Acad. Sci. **10**: 27-37. 1905, Theodor Holm published "A Morphological and Anatomical Study" of *Claytonia*, and shows that "a glance at the literature and a consideration of the species themselves must necessarily convince even the most critical systematist that *Claytonia*, as heretofore defined, can not possibly be confounded with *Montia*, nor *Montia* with *Claytonia*." He argues, however, that because "the floral structure appears essentially the same," the different groups of species should not be separated into genera. The present tendency (and it is likely to continue and grow stronger) is to segregate into separate genera plants which resemble each other, instead of calling them sections of genera. Acting on this principle it will be seen that *Claytonia* is composed of several genera. *Naiocrene*, among others, has already been separated by Rydberg.

Naiocrene filicaulis (Dougl.)

Claytonia filicaulis Dougl.; Hook. Fl. Bor. Am. **1**: 224. *pl. 72.* 1834.

Strangely enough, this plant has long been considered a synonym of *Claytonia parvifolia*, notwithstanding the differences called for in the description and in the illustration. The entire petals and veined leaves at once distinguish it. Mr. E. P.

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Sheldon has sent out good specimens of it under the name *Montia parvifolia*, collected at Seaside, Clatsop county, Oregon, June 24, 1903. This station is about twenty miles south of the mouth of the Columbia. It was originally "plentiful on moist rocks of the Columbia, near the sea," so this station is near the type locality.

Naiocrene flagellaris (Bong.)

Claytonia flagellaris Bong. Mem. Acad. Petersb. VI. **2**: 137. 1831.

Montia flagellaris Robinson, Syn. Fl. **1**: Part 1, 276. 1897.

The type of this was collected at Sitka by Mertens, and the species is not definitely known from south of Alaska.

Naiocrene obtusata

Montia obtusata Heller: Muhlenbergia **2**: 32. 1905.

The remaining species, *Naiocrene parvifolia* (Moc.) Rydb., is probably an aggregate, as it is made to include plants which do not have the same appearance.

EXTENSIONS OF RANGE.

LEWISIA REDIVIVA Pursh, was discovered in Marin county, California, not long ago by Miss Catherine H. Hittell. It grows on an isolated rock in the meadow not far from where the Fairfax and Ross valley roads join. There are several rocks similar in appearance in the same meadow, but on only this one is the *Lewisia* to be found.

LEWISIA LEANA (Porter) Robinson, is reported from the Siskiyou mountains and Oregon. I found it in the mountains of Trinity county, up Canyon creek. In August, 1905, I found a remarkable extension of its range. It was abundant on a gravelly pass at the foot of Spanish Mountain on the way to Tehipite canyon in the southern Sierra Nevada mountains, California. This mountain is the highest peak near Garlic Meadow.

ALICE EASTWOOD.

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COMPILATIONS

Under this head it is our intention to publish each month, or as often as space may permit, either entire reprints or synopses of articles which appear in journals not accessible to those who have limited library facilities. Other botanists are cordially invited to contribute, both by sending material for this department, or by pointing out where it may be obtained.

OBSERVATIONE SUR LA VEGETATION DE L'ILE DE SITCHA, PAR M. BONGARD. Mem. Acad. St. Petersb. VI. 2: 1831.

This paper is of special interest on account of the supposed occurrence of species first described therein within the western boundaries of the United States, either in the moist regions of the northwest coast at low elevations, or on the high interior mountains. The custom of citing the title of the paper instead of the publication in which it occurred is now happily discontinued. The citation "Veg. Sitch." refers to this paper. The figures after the specific name means the page number on which the description was originally printed.

SALIX SITCHENSIS Sanson mspt. 162. Amentis fructiferis breviter pedunculatis, pedunculo subfoliato; capsulis ovato-lanceolatis tomentosis pedicellatis, pedicello nectarium 2-3 superante, stylo elongato, stigmatibus bifidis (?); foliis oblongo-obovatis obsolete crenulatis, supra pubescentibus, subtus cano-tomentosis.

A Salicibus capraeis longius pedicellatis, nempe a *S. cinerea*, *grandifolia*, *capraea* et *livida* differt: amentis longioribus, pedicellis capsularum brevioribus, et stylo elongato; a ceteris praesertim foliis obovatis subtus cano-tomentosis.

ALNUS RUBRA 162. Foliis lato-ovalibus obtusis dentato-crenatis, dentibus crenulisve serratis, supra subglabris, subtus ad venas pilosis, in axillis nudis.

Rami teretes, juniores glaucescentes, vetustiores rubentes, lenticellis albis obsiti, glabri. Folia petiolata, late-ovalia, ob-

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tusa, grosse dentato-crenata; dentibus s. crenulis serratis, serraturis obtusiusculis; supra glabra, in nervis tantum pilis vestita, subtus (in sicco) subferruginea, ad nervos venasque pilosa, in axillis nuda, 2½ pollic. longa, 2 pollic. lata. Petioli semunciam circiter longi, pubescentes, juniores pilosi. Pedunculi feminei ramosi, glabri: strobuli ovati.

Nomen specificum a vulgari denominatione, qua Rossi Sitcham inhabitantes, hanc alnum designant, desumptum.

LUETKEA SIBBALDIOIDES. Tab. 2. 130. Radix repens, tenuis, fibrosa, ramulosa, perennis. Caulis longe repens, bipedalis et imo ultra, parum angulosus, pilosiusculus, penna corvina tenuior, ramosus. Rami sparsi, erecti, foliosi, breves, steriles sesquiunciales, fructiferi duplo longiores. Folia alterna, sessilia, in ramis sterilibus dense congesta, in fertilibus magis remota, bis- (rarius ter-) trifida; lobulis lanceolatis, acutis; a medio ad basin linearia, angustissima, quasi in petiolum attenuata, semunciam longa, exstipulata. Racemi congesti, pedunculo pedicellisque brevibus albo-villosis, fructiferi elongati; pedicellis 4-5 lin. longis, bracteatis. Bracteae foliis conformes, sed multo minores. Flores parvi, (albi?) in sicco lutescentes. Calyx 5-partitus; lobulis lanceolatis. Petala 5, obovata, cum lobulis calycis alterna, toro calyci adnato inserta, integerrima, sepalis duplo longiora, 1½ lin. circiter longa. 1½ lin. lata. Torus basin calycis ambiens eique totus adnatus. Stamina circiter 20, brevia, longitudine lobulorum calycis, eique mediante toro inserta. Filamenta basi parum dilatata. Antherae globulosae, rima longitudinali dehiscentes. Ovaria 5. Styli totidem filiformes, stigmate parum incrassato obtuso. Carpella 5, libera, oblonga, basi attenuata, parum curva, stylo filiformi incurvo fragili, apiculata, glabra, bivalvia; valvulis apice dehiscentibus. Semina 4, subfusiformia, parti superiori suturae internae affixa, pendula, exalbuminosa. Embryo inversus, dicotyledoneus; cotyledonibus crassiusculis.

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Genus *Spiraeae* maxime affine et notis characteristicis vix distinguendum, nisi habitus omnino alienus separationem suaderet.

Nomen generis in honorem meritissimi navarchi Luetke, itineris circa orbem terrarum ducis, scientiarumque cultoris insignis institutum.

PYRUS DIVERSIFOLIA 133. Foliis ovatis serratis integris trilobisve, utrinque pilosis adultis saepius glabriusculis, pedunculis calycibusque albo-tomentosis.

Inermis. Rami juniores albo-tomentosi, demum senescentes glabri, cinerascentes. Folia petiolata, ovata, acuminata, grosse sed acute serrata, interdum biserrata, integra vel triloba; lobis mox acutis, mox obtusis, medio longiore; basi saepissime obliqua, utrinque pilosa, praeprimis juniora, magis autem in pagina inferiori, quae etiam pallidior, demum saepius glabriuscula, eglandulosa, a 1 ½ pollice ad 3 poll. longa pollicemque lata. Petioli plus minus albo-tomentosi, interdum calvescentes, pollicem dimidium circiter longi, eglandulosi. Stipulae non observatae. Flores corymbosi; pedunculi albo-tomentosi, glandulis 2-3 instructi, rarius glabriusculi. Calyx urceolatus, utrinque albo-tomentosus, rarius extus calvescens, limbo 5-lobo; lobulis lanceolatis, acutis. Petala 5, ovata, obtusa, concaviuscula, breviter unguiculata, venulosa, 5-6 lin. longa et 3 lin. lata. Unguis angustissima, 1 lin. longa. Stamina circiter 20. Styli 3 (rarius 4), mox usque ad medium fere, mox ultra medium coaliti, apice liberi, glabri, stigmate obtuso. Ovarium triloculare, loculis dispermis.

Foliorum forma et pilositate valde ludens.

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EDITORIAL

It is our intention to issue the first number of volume 4 before the end of January if at all possible. There are many things that must be done, but we shall find time to issue this journal as regularly as possible—but we must have articles to print. Do not forget this very important item.

Several kind and thoughtful souls have already sent in their dollar for the 1908 volume, and we tender our best thanks. To those who have not yet sent in their subscription, the editor would say that there is no time like the present for doing a good deed. Do not wait for the formality of a presented bill. There is immediate use for several times the amount of the sum total of the subscriptions. And please do not subscribe through an agency or a dealer. A scientific magazine with a small subscription list cannot afford to pay a comission to an agent, and the small sum one *must* give him is not enough to allow him to make any reduction to the subscriber.

The transcripts of original descriptions which are printed in nearly every number should be of great assistance to many botanists, but in order to make the feature more useful we intend to print a separate index of the names of the species transcribed, as well as of all new species described in this magazine. In order to avoid confusion this index will be placed at the front of the volume. Since volume 2 is not yet completed, only volumes 1 and 2 will be represented in the present index, the figure 1 or 2 placed back of the page number indicating the volume in which the description may be found.

The year 1908 is with us, and the editor has been asked what he intends to do personally about Latin descriptions, and whether he will print English ones for other people. His answer has been and always will be that he most emphatically is going to continue to write descriptions in English, and earnestly

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hopes that all who have the best interests of American botany at heart will do the same. He is not opposed to Latin descriptions on general principles, and if the time ever comes when he takes up the study of foreign plants, will probably think seriously of writing Latin descriptions. What we should try to do is to encourage, not hinder, the study of plants in this vast home territory of ours, many parts of which are almost unknown botanically. Writing about our plants in an alien tongue will not advance the work. Although we are now making considerable headway as compared with conditions a few years ago, we need many more field workers, and they should not be embarassed with a foreign language. And has it occurred to you how foolish it is to be so kind and obliging to foreigners (who passed this rule) while making the work difficult for our own people? Some Europeans, especially the Germans, are engaged on works like the "Pflanzenreich," and of course they want things made easy. Their educational system is different apparently from ours. At least their botanists know more about Latin than do ours, and perhaps the study of botany is more restricted there to the graduates of the great universities. Latin descriptions simplify matters for them. That is the whole thing in a nutshell. To those who may feel timid about opposing the wishes of foreign botanists, we will say that the wording calls for the describing in Latin of "new groups." That means orders, families, genera, etc., for a species is not a "group." We have had our say, and intend to cheerfully continue the writing of descriptions in English of American plants for American botanists, or for anyone else who can read English.

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MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Volume 4

Reno, Nevada
1908

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Volume 4 February, 1908 Number 1

MUHLENBERGIA

A Monthly Journal of Botany

Edited and Published by A. A. Heller

Entered as second-class matter January 29, 1907, at the post office at Los Gatos, California, under the Act of Congress of March 3, 1879.

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Los Gatos, California.

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A. A. Heller, Editor

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Volume 4 No. 8

MUHLENBERGIA

A. A. HELLER, Editor

RENO, NEVADA, JANUARY 27, 1909

"ASPECTS OF THE SPECIES QUESTION"
(*Concluded*)

BY A. A. HELLER

Continuing his remarks, Professor Clements says that "a form or a variation is just as important" to the ecologist as a species, and that therefore he must "be partly in sympathy with the present tendency of descriptive botany to search out and describe all groups that are different, regardless of the degree of difference." But he believes that the proper way is to name varieties, or, in other words, that we must make use of trinomials. He thinks that by so doing we obtain "accuracy and clearness."

Under "Bases for Distinguishing Species," it is pointed out that the degree of morphologic difference has been the basis, or the "principle that reproductive characters are of greater worth than vegetative ones. With this the ecologist is in full accord theoretically, but he would wish to have experimental evidence before accepting it as universally true. . . It must constantly be borne in mind, especially by those who believe that evolution is always a question of the germ-plasm, that vegetative features alone are present in the blue-green algae and many of the fungi." The great fault is the dependence upon a few herbarium specimens instead "of a large number of field individuals," and the lack of "as complete a series as possible of divergent individuals."

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"Closely connected with morphologic difference is the question of the absence of intermediate forms. . . At best, it has regularly been a question of intermediate forms in the herbaria and not in the field."

"The constancy of a structure from one generation to another, or from one habitat to another has been given little attention in species-making. Yet it is precisely these which are of fundamental importance."

The ecologist "sees three critical facts in the development of a new species or any new form: (1) ancestry, (2) habitat or method of origin, (3) structural changes, very rarely functional ones. None of these can be studied adequately anywhere but on the ground."

Under "Ecologic Procedure," it is stated that "experiment should proceed whenever possible along three parallel lines, which have been designated as (1) natural experiments, where advantage is taken of natural movements into new habitats, (2) habitat cultures, where reciprocal plantings are made in original and new habitats, and (3) control cultures, where the experiments are carried on in plant-houses, where they can be controlled or directed at will."

He suggests an evolution herbarium, in which may be found the "record of field observations and experimental results. A species or a form will be represented in it by all the variations that can be discovered, and each variation by a large number of individuals. The new forms produced by nature, and by experiment in nature or under control, will likewise be adequately represented. This representation will take the form not only of the usual dried specimen, but of photographs, drawings, slides, preserved material, etc."

Under "Nomenclature and Treatment of New Forms," the question of ancestry is brought up. "When the form bears the distinct stamp of sun or shade, of a wet or dry habitat, or of hybridation, etc., our search is narrowed at once to deciding what species gives the most promise of being the parent form."

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Ecads, or forms arising from adaptation may be designated "*scias*, *helias*, *xeras* and *hydras*, denoting respectively shade form, sun form, dry form, and wet form."

"Until more is known of variants, it is proposed to designate them by a brief and applicable trinomial term, *e. g.*, *Galium boreale exiguum*."

He thinks "that it will prove difficult, if not impossible to improve upon the conventional method of designating hybrids, viz., *Galium boreale* x *trifidum*."

"In our present knowledge of mutants, it seems impossible to take the cause into account. The suggestion is accordingly made that the mutant be named with reference to its most striking characteristic, the trinomial to bear the prefix *per*, very, referring to the saltatory nature of mutation, and thus denoting the method of origin."

He gives the following examples in order to illustrate this scheme:

Cerastium strictum scias: ecad.
Verbena stricta x *hastata:* hybrid.
Aquilegia coerulea peralba: mutant.
Machaeranthera viscosa aspera: variant.

"In concluding, the exologist will confess frankly that he does not know what a species is. On the other hand, he is certain that he knows some of the things it is not, and that the species of the descriptive botanist comprise several widely different things. . . The question of what a species is can not even be answered provisionally until a sufficiently large number of experiments have been made to indicate the regular procedure in the origin of plant forms and to reveal the principles that control it."

Dr. Cowles says that "it is coming to be realized that the problems of physiology and ecology are essentially identical, not alone in the matter of the species concept, but in all respects. . . . The method of approach has differed with the point of

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view, and it is the physiologist who has given most emphasis to the fundamental importance of experimentation. The ecologist, on the other hand, has brought in the rich contributions of field observation. . . The ecologist feels that the species problem is essentially a field problem, and hence incapable of final settlement, either in the herbarium or in the laboratory. Yet it is the exact methods of the laboratory carried into the field that give promise of the solution of the problem of species."

"Perhaps no phenomena bring the principles just enunciated into more clear relief than do those of natural selection. Many species must be born that never have an opportunity to survive, owing to their lack of adaptation to the surroundings in which they originate. The mutants of *Oenothera Lamarckiana*, though developed under essentially similar conditions, do not appear equally adapted to the environment in which they first appeared; had they been left to themselves, some mutants would have perished, while others (and perhaps especially *Oenothera gigas*) might have lived."

"One of the noblest aims of ecology is the destruction of many of the "species" of our manuals. Where the critical study of species is confined to the herbarium, it often happens that ecological varieties or habitat forms are given specific rank. An excellent instance of this is seen in the case of *Polygonum amphibium* and *P. Hartwrightii*. The latter, which looks wonderfully different from the former in herbaria, can be developed at will by growing *P. amphibium* on land instead of in the water. Not infrequently a plant may be found on the edge of a pond, showing branches in the water that would commonly be referred to *P. amphibium*, and aerial branches that would be regarded as *P. Hartwrightii*. Bonnier's classic experiments, whereby many alpine plants were shown to be capable of being developed into well-known lowland species in a single generation, illustrate a phenomenon similar to that exhibited by Polygonum."

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"In the main it may be said that there are two opposing conceptions of species that are to-day struggling for mastery in the realm of biologic thought. The more prevalent idea, dating in its essence from the time of Darwin, has been that species are artificial creations, mere matters of convenience in the classification of the organic world, arbitrary concepts that have no great and enduring reality. Partisans of this view hold to the doctrine of continuity, maintaining that all species have been connected with other species by a series of intergrades, and that there is no vital distinction between variation and mutation. . . In somewhat striking contrast to this concept of species stands the idea that species are entities, which arise by discontinuous variation or mutation, and which have their full specific value from the start. Nor does time change specific form by any slow gradations; the species at its death shows no essential difference from the species at its birth."

"There are, then, two radically different conceptions of species now current, one of a rank as much higher than the other as the genus is above the Linnaean species, or the family above the genus. Ecological observations support both views, but it is especially the experimental method that has made things clear. Whether or not one calls them species, it is evident that the genus Oenothera contains a number of entities, sharply defined from one another. In such genera as Salix and Aster there is reason ts believe that species do not thus differ sharply, but that they are connected with one another by all but imperceptible gradations. . . It appears that the method of evolution in various groups of plants and animals is radically different, and it follows as a corollary that what are called species in these various groups are necessarily not homologous."

"In the future it must be recognized that the final test of the validity of species is experimental, and taxonomists must work no less in the herbarium, but more in the field and in the garden. If the taxonomists of the future fail in these respects, a hard but certain fate awaits them. The world of morpholo-

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gists, physiologists and ecologists has borne with them patiently and long, and has deferentially abided by the specific determinations of the taxonomists. The recent ebullitions of the taxonomic radicals have evoked in botanists in general successively dissatisfaction, contempt and rage. These things will not be endured much longer; a little more and the sinning taxonomists will be 'cast out into the outer darkness where there shall be wailing and gnashing of teeth."

We may perhaps be pardoned for having an inclination to wish that Dr. Cowles had shed more light on the casting out proposition. His ideas as to how it is to be done, and by whom, would be interesting. One infers that it will be done by "the world of morphologists, physiologists and ecologists." Let us suppose that the taxonomists should all take a vacation for several years, all their specimens be locked up, and all the manuals and other books that in any way help to identify plants be spirited away. The complaining gentlemen would, I think, find themselves in a very bad way, and perhaps would also have to take a vacation.

As it appears to me, the casting out will be done by the taxonomists themselves. A single example should suffice to prove the point. The sixth edition of Gray's Manual (as well as the fifth, which I used as a beginner) was far from being what it should have been, and the dissatisfaction with it led to the issuing of a work from another source which more nearly met the requirements. This new work raised the standard, and now after very many years we have in the recently issued seventh edition of "Gray's Manual," a book worthy of the name.

One can not help feeling that the ecologist especially is very unreasonable. He apparently can get along with genera only, or with a few species and an innumerable lot of "varieties." But the taxonomist needs species in his business, and must also make use of descriptions in order to show wherein one lot of plants differs from another. The ecologist has, however,

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justly called attention to a cardinal sin of the taxonomist—lack of field observation. And right here it is time to call attention to a very vital point. The radical gets all the abuse, and the conservative all the praise. In nine cases out of ten it is the conservative botanist who has had little field experience, while the "ebullitions of the taxonomic radicals" is directly traceable to a widening knowledge gained through observation of living plants, not dead and dried ones.

Granted that the methods of the taxonomist could be improved upon, he must necessarily continue to work for a long time to come just as he has done in the past—group things to the best of his ability as he finds them ready made in nature, or as they appear to him in visible form. He may experiment with plants, but one botanist or one generation of botanists can do only a very little at solving problems.

A great hindrance to the proper advance of taxonomic botany at present is lack of revisionary work. Things are hopelessly muddled in nearly all of the large genera because species are described first by one man and then by another, with no uniformity of procedure and no attempt to treat the subject as a whole. In the current numbers of the North American Flora, issued by the New York Botanical Garden, we have a remedy, but not a speedy enough one in many cases. But there is one serious defect in it, common to all works of more than local scope. It is being done by eastern men, who are no more fitted to arbitrate upon western plants than are western men to pronounce upon eastern plants, except that they have better libraries and larger collections to depend upon.

In closing I may say that it has been a difficult matter to condense into these few pages such a large amount of matter, every bit of it of great interest, and much of which necessarily could not be quoted, but I felt that such an important contribution should be brought more generally to the notice of botanists. Needless to state, the reference to "The Scientific American" on page 89 should read The American Naturalist.

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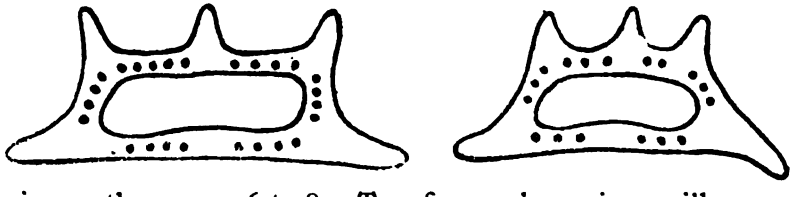
THE COLORADO CONIOSELINUM

By George E. Osterhout

In the "Revision of North American Umbelliferae" of 1888, Drs. Coulter and Rose accepted *Ligusticum scopulorum* Gray, and placed our Rocky mountain *Conioselinum* with *Conioselinum canadense* T. & G. However, when they published their "Monograph of the North American Umbelliferae" in 1900, they had reached the conclusion that Dr. Gray's *Ligusticum scopulorum* was a *Conioselinum*, and therefore it became *Conioselinum scopulorum* (Gray) C. & R., and for a *Ligusticum* of the Rocky mountains somewhat similar in appearance they gave a new name, *Ligusticum simulans*. We may of course expect that the last conclusion was carefully reached after the examination of specimens, and accept it as correct, but their description of *Ligusticum simulans* is not a very good one in that it does not mention the oil tubes of the carpels. And their description of the fruit of *Conioselinum scopulorum* does not fit that of the *Conioselinum* of Colorado, though they cite numerous Colorado specimens. Their description is: "fruit about 6 mm. long; oil tubes usually one in the dorsal intervals and 2 in the lateral, 2 to 4 on the commisural side."

I do not think there is more than one *Conioselinum* in the Colorado Rocky mountains. I have collected good fruiting specimens of it in several localities, and the fruit of none of them corresponds with the description which I have quoted. The fruit is somewhat variable because the carpels vary in the closeness of the dorsal wings, and the oil tubes vary accordingly; but in all the specimens there were more oil tubes than stated in the description. In the intervals there were 2 to 5, and on the com-



missure there were 6 to 8. Two figures here given will represent fairly well the fruit of *Conioselinum scopulorum* (Gray) C. & R. according to the Colorado specimens.

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THE PASSING OF THE PRAIRIE PLANTS IN THE GRAIN-PRODUCING MIDDLE WEST

By J. Lunell

Civilization is, generally speaking, deleterious to the wild plants. Still, in most of the states there is, and always will be, an abundance of land left to them, where they can enjoy life, unmolested through generations. In these states there is no reasonable foundation for the fear of some plants becoming extinct.

Conditions are greatly different in some of the prairie states. It is not far from the truth to say that within them no land is left intact. In the sloughs the grass is cut for hay, and afterwards the cattle are turned out to exploit what is left, and as a rule a fraction of the farm is reserved for pasture. If it is true that some kinds of plants only thrive if they get abused in every possible way by cattle, still the majority of plants will not thrive but disappear from the prairie pasture, and even many of the native species of grasses are exterminated.

Nevertheless, the possible extinction of plant life in the slough and in the pasture does not necessarily lead to the extinction of the species growing there. But in most prairie states nearly all of the land is used for the production of crops. This means a total destruction of the original vegetation and the substitution of one totally different. It means a complete change in the geographical distribution of the plants. Man needs to use the soil for the ultimate purpose of producing bread, and the plow is constantly busy overturning the virgin soil. The wild plants are buried in the ground, and after this harsh process you will never see them again. Of many species of plants which you collect to-day, you will be unable to find representatives to-morrow. In many townships the only ground untouched is the section line that the law reserves for roads. The part of it that is not needed for the road is the only refuge left for the wild flowers. It is easy to imagine what a change in the flora will

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be effected by this *improvement* of the country. I have to-day to drive seven miles from home before I can make a satisfactory collection, and in two or three years I expect to have to travel fifty miles for the purpose. I am absolutely unable to trace a number of plants which I had no difficulty in finding a few years ago. The wheat crops and the weeds have replaced them. Like the American bison and the American forest, they will be missed only when they are gone.

It is safe to predict that many plants not having a strong foothold within the country will belong to extinct species before long. It is up to the collector of the present day to use the remaining time right, and without procrastination preserve from the virgin prairie an ample supply of these plants, which soon will exist only in a few herbaria. Don't wait for the several state legislatures to do something. Their time has not come yet, but it will certainly come. As with the buffalo, it will come when the plants belong to history.

Leeds, North Dakota.

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